

# MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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**Precise Levelling**

BY

F. B. REID, B.A.Sc., D.L.S.

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# PRECISE LEVELLING.

BY F. B. REID, B.A.Sc., D.L.S.

*Supervisor of Levelling.*

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## PRECISE LEVELLING.

This publication is the sixth one on the subject of precise levelling by the Geodetic Survey of Canada, the ones previously issued being as follows:

Appendix to Chief Astronomer's report issued in 1910.

Vol. I, No. 2, issued in 1913\*

Vol. I, No. 3, " 1913

Vol. I, No. 8, " 1914

Vol. II, No. 1, " 1915

The present publication is arranged in the same general form as the previous ones, with the results of the levelling set forth in three tables. The index and map included herein are complete for all the work previously published, as well as that in the present publication; the index indicates in which publication descriptions and elevations of bench-marks published before this may be found.

Table I indicates the routes followed between terminal points and gives complete descriptions of all bench-marks established along these routes.

Table II shows in the first two columns the numbers of the bench-marks; in the third and fourth columns the approximate distance (in miles) between bench-marks, and from the initial bench-mark of the line; the fifth and sixth columns (headed "Discrepancy") give the difference (in feet) between the forward levelling and the backward levelling for each section between bench-marks and the accumulated difference from the initial bench-mark. The seventh column gives the elevations of the bench-marks shown in the second column; for convenience, these bench-marks are repeated (in the eighth column) in order that the number of any bench-mark and its elevation may be in adjoining columns. In this table are shown also the elevations determined by the Geodetic Survey for certain bench-marks established by other surveys and connected with our levelling.

\*Levelling in Yukon territory only.

Table III shows the elevations at railway stations and at crossings of intersecting railways; also on the bridges over rivers and lakes and the more important streams. Rail elevations were in all cases taken on top of the rail, in front of the telegraph office at telegraph stations and opposite the shelter or platform at flag-stations.

The results are given for the following lines:—

1. Halifax, N.S., to Moncton, N.B.
2. Bridgewater, N.S., to Windsor, N.S.
3. St. Leonard, N.B., to Campbellton, N.B.
4. McGivney Junction, N.B., to Chatham, N.B.
5. St. Anselme, Que., to Levis, Que.
6. Cookshire, Que., to Beecher Falls, Vt.
7. Sudbury, Ont., to Sault Ste. Marie, Mich.
8. Fort Frances, Ont., to Port Arthur, Ont.
9. Stanley, Ont., to North Lake, Ont.
10. Wainwright, Alta., to Edmonton, Alta.
11. Calgary, Alta., to Tofield, Alta.
12. Calgary, Alta., to Field, B.C.
13. Vancouver, B.C., to Blaine, Wash.
14. Colebrook, B.C., to Huntingdon, B.C.

Line 1—run by G. F. Dalton, 1914 and 1915—was started at a bench-mark (a chiselled groove marked with a broad arrow) on No. 3 storehouse in the Naval Yard, Halifax. The elevation of this has been fixed by the Tidal and Current Survey, Department of the Naval Service, as 12.59 feet above mean sea level at Halifax, determined from the hourly ordinates of the tide, day and night, during nine complete years. Our elevations along line 1 are based upon the above-mentioned figures and the line is terminated at Moncton upon bench-mark 132-B, the original elevation of which was carried from St. Stephen, N.B., (refer to 1910 and 1913 publications). It should be noted that the two determinations for this bench-mark—namely, from St. Stephen and from Halifax—differ by only 0.20 feet. The

levelling along line 1 has been connected with a large number of bench-marks established by the Public Works Department of Canada; these bench-marks are designated by Roman numerals. For their descriptions the reader is referred to that department. Table II in the present publication gives their elevations as determined by the Geodetic Survey. Bench-mark 135-B at Oxford Junction, the initial bench-mark of the line to Mulgrave (1913 publication), has also been connected; its elevation—89·824 feet—is 0·152 feet higher than that previously assigned to it; hence to reduce all bench-marks between Oxford Junction and Mulgrave to the present Halifax datum, the above-mentioned amount should be added to the figures given in the former publication.

Line 2 (G. F. Dalton, 1914) was started from the Halifax-Yarmouth line, which when published last year was based upon the same datum as the Halifax-Moncton line now published. At Windsor the closing error is 0·058 feet, the length of the circuit—Halifax-Bridgewater-Middleton-Windsor—being 234 miles. Line 3 (H. P. Moulton, 1914) was started from the St. Stephen-Rivière-du-Loup line (1910 publication) and closed at Campbellton upon bench-marks of the Public Works Department. Line 4 (H. P. Moulton, 1914, and G. F. Dalton, 1915) was started from the Grand Falls-Moncton line (1914 publication) and connected at Derby Junction and again at Chatham with bench-marks of the Public Works Department. Line 5 (T. C. Dennis, 1911, and J. E. Ratz, 1913) was started from the Megantic-Levis line (1913 publication) and closed upon the same line at Levis, the closing error of the circuit of 54 miles being 0·024 feet. Line 6 (G. F. Dalton, 1915) was started from the Lennoxville-Megantic line (1913 publication) and terminated at the international boundary at Beecher Falls, Vermont.

Line 7 (A. J. Rainboth, 1914 and 1915) was started from the Bala-Sudbury line (1914 publication) and terminated at Sault Ste. Marie, Mich., connection being made at that place with two bench-marks of the United States Lake Survey, on the Poe lock and the Weitzel lock respectively. Line 8 (D. McMillan and N. H. Smith, 1913) is a continuation of the



Emerson-Fort Frances line (1914 publication); at Port Arthur it is connected with a bench-mark of the Hydrographic Survey, Department of the Naval Service; the elevation of this, derived by water transfers between the years 1907 and 1914 from Marquette, Mich., is 616.154; the elevation obtained by us by our line of levels from Stephen, Minn.—refer to introduction to 1913 publication—is 615.274. Line 9 (N. H. Smith, 1913) is a branch from line 8. Line 10 (N. H. Smith, 1914) is a continuation of the Saskatoon-Wainwright line (1915 publication). Line 11 (N. H. Smith, 1915) was started from the Lethbridge-Calgary line (1915 publication) and closed at Tofield upon line 10, thus completing a circuit of the Geodetic Survey's levelling embracing Regina, Lethbridge, Calgary, Tofield and Saskatoon; the closing error of this circuit—as represented by the two elevations obtained for the junction bench-mark at Tofield—is 1.285 feet; while this is larger than the closing errors obtained on other sections of the work, it should be noted that the length of the circuit in question is almost 1,200 miles. Line 12 (G. S. Raley, 1915) commences at the same bench-mark as line 11.

Line 13 (D. McMillan, 1914) was started from the reference bench-mark of the Tidal and Current Survey, Department of the Naval Service, on the stone sill of the Welton Block, Vancouver. The following statement as to the original levels at Vancouver is furnished by the Tidal and Current Survey:—

	Above C.P.R. Datum.
Original bench-mark on old station building of Canadian Pacific railway (now demolished).....	108.35
Reference bench-mark on stone sill of the Welton Block, established by the Tidal Survey in 1912 to preserve the original levels.....	111.22
Level of "Ordinary high water" by which the C. P. R. datum is defined.....	100.00
Low water at spring tides or "Chart datum" for Vancouver harbour; defined on the charts since 1891 as 23 feet 7 inches below the bench-mark on the old C. P. R. station building.....	84.77

	Above C.P.R. Datum.
Mean sea level, as determined by the Tidal Survey from the hourly ordinates of the tide during seven complete years of observation, between 1902 and 1912.....	92.804

This is the average of these seven years and is 8.034 feet above the "Chart datum" which has been adopted since 1901 as the Zero level for the tide tables.

From the above statement it will be seen that the elevation of the reference bench-mark is 18.416 feet above mean sea level. The elevation of our bench-mark 2-J, in Vancouver post-office has been determined by precise levelling as 35.268 feet above the reference bench-mark or 53.684 feet above mean sea level. All the elevations along line 13 are based upon the above result for bench-mark 2-J, as are also the elevations along line 14, which is a branch from line 13, run during the same season by the same leveller.

All elevations given are instrumental and have had no adjustments applied to them, consequently changes may be made in the future; it should be noted, however, that in almost all cases where circuits have been closed, the closing errors are quite small.

The standard bench-mark adopted consists of a copper bolt, three-quarters of an inch in diameter and four inches long, stamped on the end with the letters "G.S.C., B.M." (Geodetic Survey of Canada, Bench-mark). The bolt is sunk horizontally in rock or masonry so that only the circular end is visible; the number of the bench-mark is stamped on this end as well as the letters mentioned above, and a horizontal chisel line is cut, upon which the elevation is taken. At certain points concrete bench-mark piers have been built; these project from six inches to one foot above the ground and extend below the frost line; the copper bolt upon which the elevation is taken is placed horizontally as in other cases, and is about nine inches below the top of the pier.

TABLE 1.

BENCH MARKS BETWEEN HALIFAX, N.S., AND MONCTON, N.B., VIA INTERCOLONIAL RAILWAY TO WINDSOR JUNCTION, DOMINION ATLANTIC RAILWAY TO TRURO AND INTERCOLONIAL RAILWAY TO MONCTON

**Note.**—These descriptions are written with the assumption that the railway runs in a northerly direction from Halifax to Windsor Junction, thence northwesterly to Windsor and thence northeasterly to Truro; between Truro and Moncton the direction has been determined (approximately) at each bench-mark.

- 385 B In east face of stone footing of pilaster at southeast corner of Intercolonial station-house, corner of North and Lockman streets, Halifax.
- 387 B In fourth course of stonework below water-table course, in west end of north wall of clock tower of custom-house, Halifax.
- 388 B In north face of seat-stone of northerly girder—on east abutment—of subway by which main road from Halifax to Truro passes under Halifax and Southwestern railway at Fairview, 3 miles from Halifax.
- 506 B In concrete bench-mark pier, 1 foot east on west line of Intercolonial railway right-of-way, 560 feet north of north end of bridge over Sackville river at Bedford and 507 feet south of mile-post 9 from Halifax.
- 507 B In first course of stonework below bridge-sill, in northeast face of south-east abutment of small plate-girder bridge on Dominion Atlantic railway, 1 mile northwest of Beaverbank.
- 508 B In exposed rock surface, 10 feet southwest of Dominion Atlantic railway track, —at southeast end of a rocky knoll about 70 feet long and 10 feet high, —situated at eighth telegraph pole southeast of mile-post 7 from Windsor Junction.
- 509 B In first course of stonework below bridge-sill, in southwest face of west retaining wall of three-span bridge on Dominion Atlantic railway,  $\frac{1}{2}$  mile northwest of South Unkenke.
- 510 B In exposed rock surface, 10 feet northeast of Dominion Atlantic railway track, 1 mile northwest of Mount Unkenke and near the centre of a rocky point of land—the second such point northwest of the station—projecting into Unkenke lake. There is a rock out immediately southeast of here.
- 511 B In northeast side of shallow rock out on Dominion Atlantic railway, 80 feet from northwest end of cut between two long deep cuts, 4 miles northwest of Mount Unkenke and at twelfth telegraph pole southeast of mile-post 17 from Windsor Junction.
- 512 B In southwest side of curved rock out on Dominion Atlantic railway, 600 feet northwest of mile-post 20 from Windsor Junction, —thence the first rock out northwest of Stillwater flag station and 3 miles southeast of Ellershurst.
- 513 B In second course of stonework below coping, in northwest end of northeast face of north retaining wall of long plate-girder bridge on Dominion Atlantic railway, 1 mile southeast of Ellershurst.
- 514 B In second course of stonework below coping, in northeast face of east retaining wall of Dominion Atlantic railway bridge over St. George's river immediately northwest of Hartville flag station.
- 515 B In fourth course of stonework below coping, in northeast face of east retaining wall of small plate-girder bridge on Dominion Atlantic railway,  $\frac{1}{2}$  mile northwest of Thompson's Point.
- 505 B In Dominion Atlantic station, Windsor, —on line from Bridgewater to Windsor.

- 516 B In first course of stonework above bridge-seat, in northwest face of retaining wall behind southwest abutment of Dominion Atlantic railway bridge over St. Croix river,  $3\frac{1}{2}$  miles northeast of Windsor.
- 517 B In second course of stonework below top, in northwest face of small square culvert under Dominion Atlantic railway, 650 feet southeast of Scotch Village.
- 518 B In fourth course of stonework below top, in northeast end of southeast face of east retaining wall of plate-girder bridge on Dominion Atlantic railway, 0.9 mile northeast of Mosherville and at mile-post 13 from Windsor.
- 519 B In southwest end of southeast face of concrete culvert under Dominion Atlantic railway, 3 miles southwest of Clarksville and  $\frac{1}{4}$  mile southwest of mile-post 16 from Windsor.
- 520 B In concrete bench-mark pier, 4 feet southeast of northwest line of Dominion Atlantic railway right-of-way, 315 feet northeast of bridge over Mile brook,  $\frac{1}{4}$  mile southwest of Clarksville and 130 feet southwest of mile-post 18 from Windsor.
- 521 B In northeast end of northwest face of stone and concrete culvert under Dominion Atlantic railway, 500 feet northeast of Clarksville station.
- 522 B In second course of stonework below bridge-seat, in southeast face of south retaining wall of Dominion Atlantic railway bridge over Kennetcook river,  $1\frac{1}{2}$  miles northeast of Clarksville.
- 523 B In southwest end of southeast face of stone and concrete culvert under Dominion Atlantic railway, 0.6 mile southwest of Kennetcook and 950 feet southwest of mile-post 26 from Windsor.
- 524 B In southeast face of concrete culvert under Dominion Atlantic railway, 550 feet southwest of Kennetcook station.
- 525 B In second course of stonework above bridge-seat, in southeast end of southwest face of retaining wall behind northeast abutment of Dominion Atlantic railway bridge over Kennetcook river, 2 miles northeast of Kennetcook.
- 526 B In third course of stonework below timber-seat, in northwest face of southwest abutment of open culvert under Dominion Atlantic railway, 200 feet northeast of Patterson.
- 527 B In southwest end of southeast face of stone and concrete culvert under Dominion Atlantic railway,  $\frac{1}{4}$  mile northeast of Burton and at fifth telegraph pole southwest of mile-post 36 from Windsor.
- 528 B In second course of stonework above bridge-seat, in northwest end of northeast face of retaining wall behind southwest abutment of Dominion Atlantic railway bridge over Fivemile river, 1 mile southwest of South Maitland.
- 529 B In southeast end of southwest face of concrete retaining wall behind northeast abutment—2 feet above bridge-seat—of Dominion Atlantic railway bridge over Shubenacadie river, 1 mile northeast of South Maitland.
- 530 B In fourth course of stonework below top, in southeast face of small square culvert under Dominion Atlantic railway,  $2\frac{1}{4}$  miles northeast of Princeport Road and 800 feet southwest of mile-post 48 from Windsor.
- 531 B In northeast end of northwest face of stone and concrete culvert under Dominion Atlantic railway, 540 feet southwest of Clifton.
- 532 B In concrete bench-mark pier, 4 feet northwest of southeast line of Dominion Atlantic railway right-of-way, 104 feet southwest of the intersection of a highway fence with the southeast line of the right-of-way,  $2\frac{1}{4}$  miles southwest of Truro station and 1,815 feet southwest of mile-post 56 from Windsor.
- 533 B In first course of stonework below bridge-seat, in southeast face of south abutment of plate-girder bridge on Dominion Atlantic railway,  $1\frac{1}{2}$  miles southwest of Truro station and  $\frac{1}{4}$  mile southwest of mile-post 57 from Windsor.

- 534 B In fourth course of stonework below water-table course, in west wall of Truro civic building—midway between first and second basement windows from northwest corner.
- 535 B In second course of stonework below water-table course, in south wall of Truro post-office, 10 feet east of the letter-drop.
- 536 B In north stone foundation wall of Bank of Nova Scotia—corner of Inglis and Prince streets—Truro. The bench-mark is 1 foot above sidewalk and 12 feet from northwest corner of building.
- 537 B In water-table course of stonework, in rear (or north) wall of Intercolonial station-house at Truro, 6 feet from northwest corner.
- 538 B In first course of stonework below bridge-seat, in east end of south face of north abutment of plate-girder bridge on Intercolonial railway,  $1\frac{1}{2}$  miles south of Folley.
- 539 B In concrete bench-mark pier, 4 feet east of west line of Intercolonial railway right-of-way, 2,860 feet south of Folley station and 405 feet south of south switch of passing-track.
- 540 B In fourth course of stonework below top, in north face of northeast retaining wall of large stone arch culvert under Intercolonial railway,  $\frac{1}{2}$  mile east of Thompson.
- 541 B In first course of stonework below cap-stone, in east face of southeast retaining wall of Intercolonial railway bridge over River Philip, 1,800 feet west of Oxford Junction.
- 542 B In concrete bench-mark pier, 4 feet north of south line of Intercolonial railway right-of-way, 26 feet west of a private crossing, 280 feet west of a small stone culvert and  $1\frac{1}{2}$  miles west of Oxford Junction.
- 543 B In north face of north face-wall of small concrete culvert under Intercolonial railway, 1,550 feet west of River Philip station.
- 544 B In second course of stonework below top, in north face of small square stone culvert under Intercolonial railway, 2 miles west of Springhill Junction.
- 545 B In concrete bench-mark pier, 4 feet west of east line of Intercolonial railway right-of-way, 1,170 feet south of a private crossing and 2 miles south of Amherst.
- 546 B In water-table course of stonework, in east end of north wall of Intercolonial station-house at Amherst.
- 547 B In fourth course of stonework below water-table course, in front (or south) wall of Amherst post-office, 6 feet west of easterly doorway.
- 548 B In first course of stonework below water-table course, in front (or south) wall of Amherst court-house, between the two basement windows to the west of main entrance.
- 549 B In water-table course of stonework, in south wall of Amherst town-hall and fire-station—5 feet from south-west corner of building.
- 550 B In north end of west face wall of concrete tile culvert under Intercolonial railway,  $\frac{1}{2}$  mile north of Memramcook.
- 551 B In concrete bench-mark pier, 1 foot south of north line of Intercolonial railway right-of-way,  $2\frac{1}{2}$  miles east of Princeston Junction of straight track—on tenth telegraph pole west of west end of a sharp curve.
- 552 B In stone water-table course, at south end of east wall of Intercolonial station-house at Moncton.

BENCH-MARKS BETWEEN BRIDGEWATER AND WINDSOR, N.S., VIA HALIFAX  
AND SOUTHWESTERN RAILWAY TO MIDDLETON AND DOMINION  
ATLANTIC RAILWAY TO WINDSOR.

Note.—These descriptions are written with the assumption that the railway runs in a northwesterly direction from Bridgewater to Middleton, thence easterly to Avonport and thence southeasterly to Windsor.

- 466-B In fourth course of stonework below top, in southwest face of west retaining wall of open culvert under Halifax and Southwestern railway, 650 feet southeast of mile-post 2 from Bridgewater Junction.
- 467-B In fifth course of stonework below top, in northeast face of east retaining wall of open culvert under Halifax and Southwestern railway—at a diagonal highway crossing—0.6 mile northwest of Mossman and  $\frac{1}{2}$  mile northwest of mile-post 5 from Bridgewater Junction.
- 468-B In third course of stonework below bridge-seat, in northeast face of east retaining wall of Halifax and Southwestern railway bridge over Lahave river, 1,200 feet southeast of Riversdale.
- 469-B In second course of stonework below timber-seat, in northeast end of southeast face of northwest abutment of open culvert under Halifax and Southwestern railway,  $2\frac{1}{4}$  miles northwest of Riversdale and 800 feet northwest of mile-post 12 from Bridgewater Junction.
- 469-B-2 In south end of east face of west concrete abutment—about 11 feet below bridge-seat—of steel highway bridge over Lahave river in the village of New Germany.
- 470-B In first course of stonework below bridge-seat, in southwest face of southeast abutment of bridge on Halifax and Southwestern railway—at a water-tank— $2\frac{1}{4}$  miles northwest of New Germany.
- 471-B In northeast side of shallow rock cut on Halifax and Southwestern railway—near centre of cut—1 mile northwest of Cherryfield and 220 feet southeast of mile-post 23 from Bridgewater Junction.
- 472-B In northwest concrete foundation wall of I. W. Roop's general store at Springfield—about 300 feet southwest of the station. The bench-mark is 4 feet below woodwork and 4 feet 8 inches northeast of basement doorway.
- 473-B In first course of stonework below timber-seat, in northeast face of southeast abutment of open culvert under Halifax and Southwestern railway,  $\frac{1}{2}$  mile northwest of mile-post 29 from Bridgewater Junction.
- 474-B In northeast side of shallow rock cut on Halifax and Southwestern railway, 540 feet northwest of mile-post 34 from Bridgewater Junction.
- 475-B In second course of stonework below bridge-seat, in north face of east retaining wall of Halifax and Southwestern railway bridge over Waterloo river, 1 mile southeast of Squirreltown.
- 476-B In northeast end of southeast face of northwest abutment of open culvert under Halifax and Southwestern railway, 600 feet northwest of mile-post 40 from Bridgewater Junction.
- 476-B-2 In concrete bench-mark pier, 4 feet northeast of southwest line of Halifax and Southwestern railway right-of-way,  $\frac{1}{2}$  mile southeast of Albany and 52 feet northwest of mile-post 41 from Bridgewater Junction—at a private crossing.
- 477-B In second course of stonework below timber-seat, in northeast end of southeast face of northwest abutment of open culvert under Halifax and Southwestern railway, 600 feet northwest of Albany.

- 478-B In northeast side of long deep rock cut, on a sharp curve on Halifax and Southwestern railway—1,680 feet southeast of mile-post 46 from Bridgewater Junction; the bench-mark is in the most prominent vertical rock face—near the middle of the cut.
- 479-B In fourth course of stonework below timber-seat, in northeast end of southeast face of northwest abutment of open culvert under Halifax and Southwestern railway, 0.6 mile southeast of Nictaux and 540 feet northwest of mile-post 49 from Bridgewater Junction.
- 480-B In rear (or northeasterly) stone foundation wall of Halifax and Southwestern station-house at Nictaux, 3 feet 6 inches below sill of most southerly window.
- 481-B In sixth course of stonework below bridge-seat, in south face of northwest retaining wall of Halifax and Southwestern railway bridge over Annapolis river, 1½ miles south of Middleton.
- 482-B In north face of square granite block supporting wooden pillar at northerly side of main entrance to the Armory at Middleton—immediately south of Dominion Atlantic railway.
- 483-B In north stone foundation wall—2 feet 2 inches below brickwork and 3 feet from northwest corner—of Royal Bank at Middleton.
- 484-B In west face of coping on south end of concrete arch culvert under Dominion Atlantic railway, 2 miles east of Middleton and 1,800 feet east of mile-post 100 from Halifax.
- 485-B In west face—11 inches below top—of north face-wall of square concrete culvert under Dominion Atlantic railway, ¾ mile east of Wilmot and 750 feet west of mile-post 97 from Halifax.
- 486-B In east concrete foundation wall—10 inches below woodwork and 40 inches from northeast corner—of apple storehouse (Markland Fruit Co.), 1,200 feet west of Kingston station.
- 487-B In south face of west abutment—6 feet 2 inches below coping of bridge-floor—of concrete highway bridge over a stream, immediately north of Dominion Atlantic railway and 1,700 feet west of Auburn station.
- 488-B In west stone foundation wall—11 inches below woodwork and 11 feet from northwest corner—of apple storehouse (Pleasant Valley Fruit Co.), immediately east of Berwick station.
- 489-B In south face-wall of concrete tile culvert under Dominion Atlantic railway, 650 feet east of Waterville station.
- 490-B In north end of west face of concrete retaining wall behind east abutment of bridge on Dominion Atlantic railway, 400 feet east of Cambridge station.
- 491-B In second course of stonework below timber-seat, in north end of east face of west abutment of open culvert under Dominion Atlantic railway, 0.4 mile east of Coldbrook and at mile-post 75 from Halifax.
- 492-B In east stone foundation wall of Kentville post-office, 15 inches above sidewalk and 8 feet north of the letter-drop.
- 493-B In west stone foundation wall of Kentville court-house, 2 feet 3 inches below brickwork and 7 feet north of stairway at main entrance.
- 494-B In fourth course of stonework below bridge-seat, in south face of southeast retaining wall of plate-girder bridge on Dominion Atlantic railway, ½ mile east of Kentville.
- 494-B 2 In concrete bench-mark pier, 6 feet north of south line of Dominion Atlantic railway right-of-way, 95 feet west of a private crossing, 1½ miles west of Wolfville and at fourth telegraph pole west of mile-post 65 from Halifax.
- 495-B In west end of south face of coping on south end of concrete arch culvert under Dominion Atlantic railway, ½ mile west of Wolfville.



- 496 B In sandstone water-table course—centre of east foundation wall—of Dominion Atlantic station-house at Wolfville.
- 497 B In first course of stonework below water-table course, in west wall of Wolfville post-office, 1 foot north of first basement window from rear of building.
- 498 B In west concrete foundation wall—16 inches below woodwork and 30 inches from northwest corner—of office at west end of apple storehouse (Grand Pré Fruit and Packing Co.), immediately east of Grand Pré station.
- 499 B In north face-wall of concrete tile culvert under Dominion Atlantic railway, 1 mile east of Avonport and 200 feet east of mile-post 57 from Halifax.
- 500 B In southwest face-wall—immediately above west wing-wall—of large stone and concrete culvert under Dominion Atlantic railway,  $\frac{1}{4}$  mile northwest of Hantsport.
- 501 B In southwest face-wall—immediately above west wing-wall—of square concrete culvert under Dominion Atlantic railway, 600 feet southeast of Mount Denison.
- 502 B In southwest face—1 foot below top—of concrete retaining wall behind southeast abutment of Dominion Atlantic railway bridge over Avon river, between Falmouth and Windsor.
- 503 B In west stone foundation wall of Windsor post-office, 3 feet below brickwork and 10 feet south of the letter-drop.
- 504 B In first course of stonework below water-table course, in west foundation wall of Windsor civic building, 15 feet 6 inches north of large door of fire-hall.
- 505 B In first course of stonework below water-table course, in east wall—3 feet from northeast corner—of Dominion Atlantic station-house at Windsor.

BENCH-MARKS BETWEEN ST. LEONARD AND CAMPBELLTON, N.B., VIA  
INTERCOLONIAL RAILWAY.

**Note.**—These descriptions are written with the assumption that the railway runs in a northeasterly direction from St. Leonard to Campbellton.

- 1 G In southeast face—10 inches below top—of northeast concrete abutment of plate-girder bridge on Intercolonial railway, about 5 miles northeast of St. Leonard and at mileage 106.7 from Campbellton.
- 2 G In concrete bench-mark pier, 43 feet northwest of Intercolonial railway track, 200 feet southwest of a timber culvert—opposite a log cabin—and between tenth and eleventh telegraph poles northeast of mile-post 100 from Campbellton.
- 3 G In southeast face—19 inches below top—of southwest concrete abutment of plate-girder bridge on Intercolonial railway, at southwesterly end of Grand River siding and at mile-post 96 from Campbellton.
- 4 G In southeast face—23 inches below top—of southwest concrete abutment of plate-girder bridge on Intercolonial railway, at northeasterly end of Grand River siding and at mileage 95.8 from Campbellton.
- 5 G In southeast face—16 inches below top—of northeast concrete abutment of plate-girder bridge on Intercolonial railway, at mileage 91.5 from Campbellton.
- 6 G In southeast face—15 inches below top—of northeast concrete abutment of Intercolonial railway bridge over Grand river at mileage 85.4 from Campbellton.



- 7-G In concrete bench-mark pier, 30 feet northwest of Intercolonial railway track, 2.4 miles southwest of Jardine Brook station and 120 feet northeast of mile-post 80 from Campbellton—on top of a small knoll immediately southwest of Hammond siding.
- 8-G In southeast face—20 inches below top—of southwest concrete abutment of Intercolonial railway bridge over Jardine brook, 2.4 miles northeast of Jardine Brook station.
- 9-G In south face of exposed rock surface, 16 feet southeast of Intercolonial railway track,  $\frac{1}{2}$  mile southwest of Hazen and at fifth telegraph pole southwest of mile-post 72 from Campbellton.
- 10-G In southeast face—19 inches below top—of southwest concrete abutment of plate-girder bridge on Intercolonial railway, 3 miles northeast of Anderson and at mileage 66.6 from Campbellton.
- 11-G In southeast side of rock cut on Intercolonial railway—near centre of cut—550 feet southwest of a small wooden culvert in a deep fill,  $5\frac{1}{4}$  miles northeast of Anderson and at mileage 64.3 from Campbellton.
- 12-G In concrete bench-mark pier, 34 feet southeast of Intercolonial railway track, 515 feet northeast of mile-post 56 from Campbellton and 70 feet northeast of easterly switch of the Y, about  $1\frac{1}{2}$  miles southwest of Kedgwick.
- 13-G In south face of boulder, 25 feet northwest of Intercolonial railway track,  $2\frac{1}{4}$  miles northeast of Kedgwick and 50 feet northeast of mile-post 52 from Campbellton.
- 14-G In southeast face—19 inches below top—of northeast concrete abutment of small bridge on Intercolonial railway,  $4\frac{1}{4}$  miles northeast of Kedgwick and at mileage 49.6 from Campbellton.
- 15-G In concrete bench-mark pier, 38 feet northwest of Intercolonial railway track,  $12\frac{1}{4}$  miles northeast of Kedgwick and 157 feet northeast of mile-post 42 from Campbellton.
- 16-G In southeast face—16 inches below top—of southwest concrete abutment of plate-girder bridge over Grog brook, at mileage 34.8 from Campbellton.
- 17-G In southeast face—17 inches below top—of southwest concrete abutment of plate-girder bridge over Grog brook, at mileage 31.8 from Campbellton.
- 18-G In southeast face—16 inches below top—of southwest concrete abutment of plate-girder bridge over Grog brook, at second telegraph pole southwest of mile-post 29 from Campbellton.
- 19-G In southeast face—18 inches below top—of southwest concrete abutment of plate-girder bridge over Grog brook, at mile-post 27 from Campbellton.
- 20-G In south face of exposed rock surface, 33 feet northwest of Intercolonial railway track and 150 feet southwest of mile-post 24 from Campbellton. This is about the centre of a high rocky bank facing the track at a point where Grog brook runs close beside the track.
- 21-G In northwest end of southwest face of concrete retaining wall behind northeast abutment—3 feet 6 inches above bridge-seat—of Intercolonial railway bridge over Upsalquitch river, immediately northeast of Upsalquitch.
- 22-G In concrete bench-mark pier, 33 feet northwest of Intercolonial railway track, 950 feet northeast of a small timber culvert and 190 feet northeast of mile-post 11 from Campbellton.
- 23-G In northwest face of concrete retaining wall behind southwest abutment—9 inches above bridge-seat—of plate-girder bridge over Christopher brook, at mileage 7.2 from Campbellton.
- 24-G In east face of east concrete wall of northerly (or smaller) gate chamber of Intercolonial railway reservoir, 2 miles from Campbellton—on the line to St. Leonard. The bench-mark is 8 inches below top of concrete, 9 feet south (or in rear) of crest of weir and 11 feet 6 inches north of northerly wall of main gate chamber.

- 25 G In water-table course of stonework, in front (or north) wall of Intercolonial station-house at Campbellton, 16 feet from northwest corner.
- 26 G In north stone foundation wall of Campbellton post-office, 3 feet below brickwork and 5 feet to the right of the letter-drop.

BENCH-MARKS BETWEEN MCGIVNEY JUNCTION AND CHATHAM, N.B.,  
VIA INTERCOLONIAL RAILWAY.

**Note.**—These descriptions are written with the assumption that the railway runs in a northeasterly direction from McGivney Junction to Chatham.

- 31 G In southeast end of southwest face of concrete retaining wall behind northeast abutment—21 inches above bridge-seat—of plate-girder bridge on Intercolonial railway,  $4\frac{1}{2}$  miles northeast of McGivney Junction and at mileage 70.7 from Derby Junction.
- 32 G In northwest side—1 foot below rail level—of rock cut on Intercolonial railway, 30 feet southwest of a railway bench-mark, painted white (on opposite side of cut), 1.6 miles southwest of Boiestown and 510 feet southwest of mile-post 64 from Derby Junction.
- 33 G In southeast face—16 inches below top and 34 inches back from southwest face—of concrete retaining wall behind northeast abutment of long plate-girder bridge on Intercolonial railway, 2,100 feet northeast of Boiestown.
- 34 G In concrete bench-mark pier, 8 feet southeast of northwest line of Intercolonial railway right-of-way, 120 feet southwest of a private crossing and 770 feet northeast of mile-post 56 from Derby Junction.
- 35 G In southeast face-wall of concrete tile culvert under Intercolonial railway, 540 feet northeast of Carroll flag-station.
- 36 G In northwest face of exposed rock surface, 11 feet southeast of centre line of Intercolonial railway track—25 inches below rail level—2.6 miles southwest of Doaktown and 78 feet southwest of mile-post 49 from Derby Junction.
- 37 G In southeast end of southwest face of stone and concrete retaining wall behind northeast abutment—30 inches above bridge-seat—of Intercolonial railway bridge over Southwest Miramichi river,  $\frac{1}{2}$  mile northeast of Doaktown.
- 38 G In centre of northwest face of cap-stone on northwest end of small square culvert under Intercolonial railway,  $\frac{3}{4}$  mile northeast of Blissfield flag-station and 3,000 feet northeast of mile-post 42 from Derby Junction.
- 39 G In northwest face-wall of concrete tile culvert under Intercolonial railway, 2,250 feet southwest of mile-post 39 from Derby Junction.
- 40 G In concrete bench-mark pier, 7 feet southeast of northwest line of Intercolonial railway right-of-way,  $\frac{1}{4}$  mile southwest of Upper Blackville and 90 feet southwest of mile-post 32 from Derby Junction.
- 41 G In southeast face-wall of concrete tile culvert under Intercolonial railway,  $3\frac{1}{2}$  miles southwest of Blackville and 400 feet northeast of mile-post 26 from Derby Junction.
- 42 G In southwest face of coping on southeast end of concrete arch culvert under Intercolonial railway,  $1\frac{1}{2}$  miles southwest of Blackville and 120 feet northeast of mile-post 24 from Derby Junction.
- 43 G In southeast end of northeast face of concrete retaining wall behind southwest abutment of plate-girder bridge on Intercolonial railway,  $1\frac{1}{4}$  miles northeast of Blackville and 400 feet northeast of mile-post 21 from Derby Junction.

- 44 G In southeast face of southeast face-wall of concrete tile culvert under Intercolonial railway, 230 feet northeast of a diagonal highway crossing and 2,500 feet southwest of mile-post 16 from Derby Junction.
- 45 G In west face of iron retaining wall behind north abutment, 30 inches above bridge-seat of steel highway bridge over Southwest Miramichi river at Quarryville.
- 46 G In first course of stonework above timber-seat, in northwest face of southwest abutment of open culvert under Intercolonial railway, 550 feet southwest of mile-post 8 from Derby Junction.
- 47 G In first course of stonework below timber-seat, in northwest face of northeast abutment of open culvert under Intercolonial railway, at a private crossing,  $\frac{1}{4}$  mile northeast of Millerton and 170 feet southwest of mile-post 4 from Derby Junction.
- 47 G 2 In concrete bench-mark pier at Nelson Junction, 3 feet east of west line of right-of-way of Intercolonial railway (main line), 43 feet south of a farm crossing and 1,420 feet south of south end of bridge over Southwest Miramichi river.
- 48 G In northwest face of small square concrete culvert under Intercolonial railway,  $1\frac{1}{2}$  miles northeast of Nelson and 2,200 feet northeast of mile-post 4 from Nelson Junction.
- 49 G In water-table course of stonework, in rear (or south) wall of Intercolonial station-house at Chatham, in third stone from southwest corner of building.

BENCH-MARKS BETWEEN ST. ANSELME AND LEVIS, QUE.,  
VIA NATIONAL TRANSCONTINENTAL RAILWAY.

**Note.** These levels were carried along the National Transcontinental railway to the overhead crossing of the Intercolonial railway, about  $1\frac{1}{2}$  miles northeast of Chaudiere Junction and thence along the Intercolonial railway to Levis, closing on bench-mark 222-B.

- 250 B In south face of coping on south end of concrete tile culvert under National Transcontinental railway—at the west side of a highway crossing,  $1\frac{1}{4}$  miles west of St. Anselme and at mileage 81.1 from Monk.
- 251 B In west end of south face of concrete coping on south end of concrete arch culvert under National Transcontinental railway, 1 mile east of St. Isidore and at mileage 84.4 from Monk.
- 252 B In east end of north face of concrete coping on north end of iron pipe culvert under National Transcontinental railway,  $1\frac{1}{4}$  miles west of St. Isidore and at mileage 87.2 from Monk.
- 253 B In north end of east face of concrete coping on east end of iron pipe culvert under National Transcontinental railway, at mileage 89.5 from Monk and midway between two private crossings 100 yards apart.
- 254 B In west sloping face, 8 inches below top, of concrete retaining wall behind north abutment of plate-girder bridge on National Transcontinental railway,  $\frac{1}{4}$  mile north of Beaudet and at mileage 91.9 from Monk.
- 255 B In west face of flat boulder projecting slightly above ground, 20 feet west of National Transcontinental railway track, 50 feet north of a private crossing and between sixth and seventh telegraph poles south of mile-post 94 from Monk.
- 256 B In west face of concrete coping on north end of concrete arch culvert under National Transcontinental railway, 3 miles east of Diamond Junction and at mile-post 98 from Monk.
- 257 B In north end of east concrete foundation wall of signal tower at Diamond Junction—the crossing of National Transcontinental railway and Intercolonial railway cut-off.

258-B Destroyed.

259-B In east end of north face of concrete retaining wall behind north abutment of subway by which main road to Levis passes under National Transcontinental railway, 600 feet south of south abutment of Quebec bridge.

222-B In stone water-table course of south foundation wall—3 feet 6 inches west of main doorway—of power station of Dussault and Powers, on St. Laurent street, Levis

BENCH-MARKS BETWEEN COOKSHIRE, QUE., AND BEECHER FALLS, VERMONT,  
VIA MAINE CENTRAL RAILROAD

551-B In second course of stonework below top, in east face of south abutment of open culvert under Maine Central railroad,  $3\frac{1}{2}$  miles south of Cookshire and 1,340 feet south of mile-post 21 from Lime Ridge.

552-B In east concrete foundation wall—2 feet below sheeting and 3 feet from southeast corner—of Mohawk Dairy company's building at Sawyerville.

553-B In first course of stonework below bridge-seat, in west face of south abutment of plate-girder bridge on Maine Central railroad,  $2\frac{1}{4}$  miles south of Sawyerville and 1,700 feet north of mile-post 27 from Lime Ridge.

554-B In east face of large boulder, 20 feet east of Maine Central railroad track, 160 feet south of a wooden culvert, 2 miles south of St. Isidore and 780 feet south of mile-post 33 from Lime Ridge.

555-B In concrete bench-mark pier, 4 feet west of east line of Maine Central railroad right-of-way,  $\frac{1}{2}$  mile south of St. Malo and 720 feet north of mile-post 36 from Lime Ridge.

556-B In second course of stonework above bridge-seat, in east end of south face of retaining wall behind north abutment of Maine Central railroad bridge over east branch of Hall stream, 3 miles south of Malvina.

557-B In west face—2 feet 6 inches below top—of rock exposure lying along east right-of-way fence of Maine Central railroad, 615 feet south of a wooden culvert,  $\frac{1}{2}$  mile south of Paquette and 2,130 feet north of mile-post 46 from Lime Ridge.

558-B In first course of stonework above bridge-seat, in east face of northeast retaining wall of Maine Central railroad bridge over middle branch of Hall stream, 1 mile north of East Hereford and 130 feet north of mile-post 48 from Lime Ridge.

559-B In west end of south face of stone retaining wall behind north abutment of Maine Central railroad bridge over west branch of Hall stream, 1,000 feet north of East Hereford station.

560-B In second course below top, in west face of square stone culvert under Maine Central railroad, 1 mile north of Comin Mills station and 660 feet north of mile-post 52 from Lime Ridge.

561-B In south face of large mass of rock which just fills the space between the track and the west right-of-way fence of Maine Central railroad,  $\frac{1}{2}$  mile north of Comin Mills station and immediately south of Frank Rowell's residence. The bench-mark is about 1 foot above ground surface and near centre of southerly face of rock

562-B In east side of stone boundary monument No. 519-A, situated in the door-yard of Chouinard's "line house" at the international boundary—immediately west of Maine Central railroad and  $\frac{1}{4}$  mile south of Comin Mills station

93436  $2\frac{1}{2}$

BENCH-MARKS BETWEEN SUDBURY, ONT., AND SAULT STE. MARIE, MICH.,  
VIA CANADIAN PACIFIC RAILWAY

- 567 A In third course of stonework above concrete sidewalk, in south face of Durham street entrance to Sudbury post-office, 21 feet from southwest corner of building
- 568 In north face of small square concrete culvert under Canadian Pacific railway, at mileage 1.9 from Sudbury
- 569 In south face of exposed rock surface, 6 feet north of Canadian Pacific railway track and at eleventh telegraph pole west of mile-post 6 from Sudbury
- 570 In second course of stonework below top, in southeast face of southeast wing-wall of large stone arch culvert under Canadian Pacific railway, 2 miles east of Naughton and at mileage 9.3 from Sudbury
- 571 In south side of short deep rock cut on Canadian Pacific railway—50 feet from west end of cut— $1\frac{1}{2}$  miles west of Naughton and at thirteenth telegraph pole east of mile-post 13 from Sudbury
- 572 In south face of central supporting wall of double concrete culvert under Canadian Pacific railway, 24 miles west of Naughton and at mile-post 14 from Sudbury
- 573 In north face—16 inches below top—of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over Vermilion river,  $2\frac{1}{4}$  miles east of Whitefish
- 574 In south end of west face of concrete retaining wall behind east abutment—3 feet above bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{4}$  miles east of Whitefish and at mileage 17.14 from Sudbury
- 575 In north end of west face of concrete retaining wall behind east abutment—2 feet above bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{4}$  miles west of Whitefish and at mileage 20.13 from Sudbury
- 576 In west end of north face of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles west of Victoria Mine and at mileage 23.4 from Sudbury
- 577 In east face of north face-wall of square concrete culvert under Canadian Pacific railway, 1 mile west of Worthington and at mileage 26.2 from Sudbury
- 578 In north face—10 inches below top—of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{4}$  miles east of Nairn and at mileage 29.8 from Sudbury
- 579 In east face of northeast sloping retaining wall—22 inches below top of north face-wall—of stone and concrete culvert under Canadian Pacific railway,  $\frac{1}{4}$  mile east of Nairn
- 580 In north end of west face of concrete retaining wall behind east abutment—27 inches above bridge-seat—of bridge by which Canadian Pacific railway passes over Algoma Eastern railway,  $\frac{1}{4}$  mile west of Nairn
- 581 In second course of stonework above bridge-seat, in south face—22 inches from west end—of southeast retaining wall of Canadian Pacific railway bridge over Spanish river, 5 miles west of Nairn
- 582 In north face of concrete footing of highway bridge over Canadian Pacific railway at mileage 38.8 from Sudbury, 150 feet east of east switch of Lorne passing-track. The footing referred to is the first one south of the track and is at the west side of the bridge
- 583 In south face—1 foot above level—of large mass of rock, 10 feet north of Canadian Pacific railway track and 1 mile west of Espanola

- 584 In concrete bench-mark pier, 6 feet south of north line of Canadian Pacific railway right-of-way,  $3\frac{1}{2}$  miles east of Webbwood and exactly opposite a whistle-post between third and fourth telegraph poles east of mile-post 15 from Sudbury.
- 585 In south concrete foundation wall (facing main line track) of Canadian Pacific roundhouse at Webbwood, 1 foot below brickwork and in first pilaster from southeast corner.
- 586 In second course of stonework above bridge-seat, in south end of west face of retaining wall behind east abutment of Canadian Pacific railway bridge over Birch brook, 1 mile west of Webbwood.
- 587 In north face of concrete footing of highway bridge over Canadian Pacific railway, 2 miles west of Webbwood. The footing referred to is the first one south of the track and is at the west side of the bridge.
- 588 In second course of stonework below top, in southeast face of southeast wing-wall of stone arch culvert under Canadian Pacific railway, 200 feet east of east switch of Hallam passing-track and at mileage 4.8 from Webbwood.
- 589 In north faces-wall—immediately above northeast wing-wall—of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles east of Massey and at mileage 8.53 from Webbwood.
- 590 In third course of stonework above bridge-seat, in north end of west face of retaining wall behind east abutment of Canadian Pacific railway bridge over River aux Sables, immediately east of Massey.
- 591 In east end of north face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles west of Massey and at mile-post 12 from Webbwood.
- 592 In north end of west face of concrete retaining wall behind east abutment—3 feet above bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{4}$  miles east of Walford and at mileage 15.46 from Webbwood.
- 593 In centre of north face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles east of Walford and at mileage 16.83 from Webbwood.
- 594 In north faces-wall—immediately above northeast wing-wall—of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles east of Spanish and at mileage 21.6 from Webbwood.
- 595 In south faces-wall—immediately above southwest wing-wall—of square concrete culvert under Canadian Pacific railway,  $\frac{1}{4}$  mile west of Spanish.
- 596 In north face of exposed rock surface, 15 feet south of Canadian Pacific railway track and at sixth telegraph pole east of mile-post 27 from Webbwood. The bench-mark is near the centre of the rock exposure and directly below an outcrop of quartz.
- 597 In south faces-wall—immediately above southwest wing-wall—of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles west of Cutler and at mileage 30.8 from Webbwood.
- 598 In west face of concrete retaining wall behind east abutment—3 feet above bridge-seat and 4 feet from north end of retaining wall—of Canadian Pacific railway bridge over Serpent river, at mileage 34.7 from Webbwood.
- 599 In second course of stonework below top, in west end of south face of southwest retaining wall of large square culvert under Canadian Pacific railway,  $2\frac{1}{4}$  miles east of Spragge, 200 feet east of a private crossing and at mileage 36.4 from Webbwood.
- 600 In south end of east face of concrete retaining wall behind west abutment—2 feet above bridge-seat—of bridge on Canadian Pacific railway, 800 feet west of Spragge station.
- 601 In concrete bench-mark pier, 6 feet south of north line of Canadian Pacific railway right-of-way, at seventeenth telegraph pole west of mile-post 41 from Webbwood and 120 feet west of McPerson east mile-board.

- 602 In south face—10 inches below top—of concrete retaining wall behind west abutment of Canadian Pacific railway bridge over Lauzon river, immediately east of Algoma.
- 603 In south face of large boulder, 10 feet south of north line of Canadian Pacific railway right-of-way and 75 feet west of mile-post 51 from Webbwood.
- 604 In first course of stonework above bridge-seat, in south end of west face of retaining wall behind east abutment of Canadian Pacific railway bridge over Blind river, immediately west of Blind River station.
- 605 In second course of stonework below brickwork, in north wall of Blind River town-hall, 7 feet 3 inches from north-west corner.
- 606 In north end of west face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway, 2 miles west of Blind River station and at mileage 56.3 from Webbwood.
- 607 In first course of stonework above plate-girder seat, in north end of east face of stone pier at east end of steel truss span in Canadian Pacific railway bridge over Missisquoi river, 4 miles west of Blind River station.
- 608 In north face-wall—immediately above northeast wing-wall—of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Dean Lake station and at mile-post 62 from Webbwood.
- 609 In south side of rock cut on Canadian Pacific railway—near east end of cut—at mile-post 65 from Webbwood. This is the first rock cut west of Dean Lake station.
- 610 In north end of west face of east abutment wall of square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  miles west of Dean Lake station and at mileage 67.9 from Webbwood.
- 611 In north side—70 feet from west end—of rock-cut on Canadian Pacific railway at mileage 71.5 from Webbwood.
- 612 In north side of rock cut on Canadian Pacific railway, 600 feet west of westerly switch at Dayton and 90 feet from mile-post 74 from Webbwood.
- 613 In south face of exposed rock surface, 70 feet north of Canadian Pacific railway track and north of north line of right-of-way—opposite mile-post 77 from Webbwood.
- 614 In east face of north face-wall of concrete arch culvert under Canadian Pacific railway at mileage 79.8 from Webbwood.
- 615 In east face of coping on north end of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Thessalon and at fifth telegraph pole west of mile-post 84 from Webbwood.
- 616 In west face of concrete retaining wall behind east abutment (at south side of southerly girder) of Canadian Pacific railway bridge over Thessalon river,  $2\frac{1}{2}$  miles west of Thessalon and immediately west of westerly section of Sherwood passenger track.
- 616 A In west face of coping on north end of concrete arch culvert under Canadian Pacific railway, between third and fourth telegraph poles east of mile-post 89 from Webbwood.
- 617 In east end of north face of coping on north end of concrete arch culvert under Canadian Pacific railway at mileage 94.1 from Webbwood.
- 618 In concrete pier at mile-post 4 west south of north line of Canadian Pacific railway right-of-way,  $1\frac{1}{2}$  miles east of Thessalon and west telegraph pole west of mile-post 93 from Webbwood.
- 619 In east end of north face of concrete culvert under Canadian Pacific railway about 700 feet east of Thessalon.
- 620 In north face of concrete culvert under Canadian Pacific railway, at eleventh telegraph pole east of mile-post 100 from Webbwood.

- 621 In north face of concrete retaining wall behind east abutment—immediately above northeast wing-wall of plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Desbarats.
- 622 In north face of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over Walker river, immediately east of Desbarats.
- 623 In north side of rock cut on Canadian Pacific railway—near west end of cut—at fifteenth telegraph pole east of mile-post 107 from Webbwood.
- 624 In north face of granite boulder, 80 feet north of Canadian Pacific railway track and directly opposite second telegraph pole west of Ishbestor station.
- 625 In south end of east face—3 feet below top—of concrete retaining wall behind west abutment of Canadian Pacific railway bridge over Bar river, immediately west of Bar River flag-station.
- 626 In east face—6 feet from north end—of concrete head-wall at east end of circular culvert at the main corner of the village of Echo Bay: the culvert lies along the south line of the street to Ekoba station.
- 627 In south face of concrete retaining wall behind west abutment of Canadian Pacific railway bridge over the outlet of Echo bay,  $\frac{1}{2}$  mile west of Ekoba.
- 628 In east end of north face of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Ekoba and at twelfth telegraph pole east of mile-post 119 from Webbwood.
- 629 In north face—4 feet below top—of northeast stone retaining wall of Canadian Pacific railway bridge over Garden river,  $\frac{1}{2}$  mile east of Garden station.
- 630 In north end of west face of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over Root river,  $5\frac{1}{2}$  miles east of Sault Ste. Marie, Ont., and at mileage 125.5 from Webbwood.
- 631 In east end—2 feet below top—of north face-wall of concrete culvert under a highway, 70 feet south of Canadian Pacific railway track, 2 miles east of Sault Ste. Marie, Ont., and opposite second telegraph pole east of mile-post 129 from Webbwood.
- 632 In second course of stonework below water-table course, in rear (or north) wall—10 feet from northeast corner—of post-office at Sault Ste. Marie, Ont.
- 633 In east stone foundation wall—3 feet 4 inches below brickwork and 4 feet 8 inches from southeast corner of Carnegie Library at Sault Ste. Marie, Ont.
- 634 In front (or south) wall of Steelton post-office, 6 feet 6 inches below brickwork and 14 feet from southeast corner of building.
- 635 In third course of stonework below top, in south end of east face of southeast retaining wall of Canadian Pacific railway swing bridge over Canadian ship canal, between Sault Ste. Marie, Ont., and Sault Ste. Marie, Mich.
- 636 In west concrete foundation wall of Government power station, situated immediately north of the new ship canal at Sault Ste. Marie, Mich. The bench-mark is 19 inches below water-table and 4 feet 7 inches north of the doorway by which a spur line of railway enters the building.

BENCH-MARKS BETWEEN FORT FRANCES AND PORT ARTHUR, ON  
VIA CANADIAN NORTHERN RAILWAY

- 314 In south face of exposed rock surface, 3 feet south of north line of Canadian Northern railway right-of-way, directly and nearly west wall of a large house on north side of railway,  $2\frac{1}{2}$  miles east of Fort Frances and at eleventh telegraph pole east of mile-post 229 from Port Arthur.



- 32 E In north side of rock cut on Canadian Northern railway, 710 feet west of west end of a trestle over a part of Rainy Lake at the second telegraph pole east of a point of rock which separates the present right-of-way from the abandoned one lying to the south, and at mileage 224.5 from Port Arthur.
- 33 E In north face of exposed rock surface, 40 feet south of Canadian Northern railway track, 1,500 feet west of west end of a trestle bridge over a part of Rainy lake and 1,850 feet west of mile-post 221 from Port Arthur.
- 34 E In south face of exposed rock surface, 30 feet north of Canadian Northern railway track, 460 feet east of a timber bridge and 15 feet east of mile-post 218 from Port Arthur.
- 35 E In southwest face of exposed rock surface, 20 feet north of Canadian Northern railway track, 250 feet east of a wooden culvert, 20 feet east of mile-post 214 from Port Arthur and at western end of a rocky hill.
- 36 E In east face of ledge of rock, 33 feet north of Canadian Northern railway track, at first telegraph pole east of mile-post 211 from Port Arthur and opposite sign "Draw-span 1,200 feet"—west of bascule bridge over a channel of Rainy lake.
- 37 E In north face of the mass of rock, 36 feet south of Canadian Northern railway main line, 730 feet west of Bear Pass station and 140 feet east of west switch of passing-track.
- 38 E In south face of the boulder about 8 feet square and 2 feet high, 60 feet north of Canadian Northern railway track, 430 feet east of a timber bridge over a part of Rainy lake and at mileage 203.6 from Port Arthur.
- 39 E In north face of exposed rock surface, 30 feet south of Canadian Northern railway track, 630 feet west of a trestle bridge and between seventh and eighth telegraph poles west of mile-post 199 from Port Arthur.
- 40 E In north face of exposed rock surface, 40 feet south of Canadian Northern railway track, opposite a whistle-post for west-bound trains, 670 feet east of Olive west mile-board and 110 feet east of mile-post 196 from Port Arthur.
- 41 E In south face, near centre, of hill of rock about 100 feet long, and 50 feet north of Canadian Northern railway track, this is about  $\frac{1}{4}$  mile west of Mine Centre and between seventh and eighth telegraph poles west of mile-post 192 from Port Arthur.
- 42 E In northwest face of large mass of rock, 80 feet south of Canadian Northern railway main line, 200 feet east of Mine Centre station-house and 52 feet northeast of northeast corner of general store opposite the station.
- 43 E In concrete benchmark pier, 42 feet south of Canadian Northern railway track, 275 feet west of Turtle west mile-board and 145 feet west of mile-post 188 from Port Arthur.
- 44 E In north face of sloping rock surface, 90 feet south of Canadian Northern railway track and at twelfth telegraph pole east of mile-post 184 from Port Arthur, immediately west of a shallow earth cut which immediately west of a track cut.
- 45 E In north face of sloping rock surface, 70 feet south of Canadian Northern railway main line, within the limits of the old passing-track, and between fourth and fifth telegraph poles east of mile-post 184 from Port Arthur.
- 46 E In south face of large the mass exposed, 50 feet north of Canadian Northern railway track, 200 feet east of Marquette west mile-board and 110 feet west of mile-post 177 from Port Arthur.
- 47 E In north face of exposed rock surface, 30 feet south of Canadian Northern railway track, slightly below the level of a trestle bridge over Seine river and at third telegraph pole west of mile-post 174 from Port Arthur.

- 48 E In north face of exposed rock surface—about 7 feet in length and 2 feet in height—60 feet south of Canadian Northern railway main line, 1,200 feet east of La Seine station and at second telegraph pole west of mile-post 171 from Port Arthur.
- 49 E In west face of exposed rock surface—50 feet north of Canadian Northern railway track and about at rail level—at east end of a long deep fill, and at ninth telegraph pole east of mile-post 167 from Port Arthur.
- 50 E In south face of large mass of rock, 50 feet north of Canadian Northern railway track, 50 feet east of a whistle-post for westbound trains and at twelfth telegraph pole east of mile-post 163 from Port Arthur.
- 51 E In south side—at extreme west end—of long deep rock cut on Canadian Northern railway, 1,530 feet east of Banning station.
- 52 E In east face of exposed rock surface, 100 feet south of Canadian Northern railway track and about at rail level, between second and third telegraph poles west of mile-post 156 from Port Arthur.
- 53 E In north face of exposed rock surface, 100 feet south of Canadian Northern railway track and between second and third telegraph pole east of mile-post 152 from Port Arthur— $\frac{1}{2}$  mile east of east switch of Elizabeth passing-track.
- 54 E In south side of rock cut on Canadian Northern railway—at extreme east end of cut—at fourth telegraph pole east of mile-post 147 from Port Arthur.
- 55 E In north side of rock exposure about 40 feet long and 8 feet south of Canadian Northern railway track—in centre of shallow earth cut—between eighth and ninth telegraph poles west of Atikokan west mile-board and at mileage 143.8 from Port Arthur.
- 56 E In north end of west face of concrete retaining wall behind east abutment of Canadian Northern railway bridge over Atikokan river,  $2\frac{1}{2}$  miles east of Atikokan and at mileage 139.9 from Port Arthur.
- 57 E In south face—60 feet from west end—of high rocky bank immediately north of Canadian Northern railway track, 140 feet west of east switch of Oleott passing-track and between fifth and sixth telegraph poles east of mile-post 137 from Port Arthur.
- 58 E In south side of rock cut on Canadian Northern railway—200 feet from east end of cut—280 feet west of Hematite west mile-board and between second and third telegraph poles east of mile-post 133 from Port Arthur.
- 59 E In north side of long rock cut on Canadian Northern railway—150 feet from east end of cut—between second and third telegraph poles east of mile-post 128 from Port Arthur.
- 60 E In west face of exposed rock surface, 10 feet north of Canadian Northern railway track—at west end of a rock cut— $2\frac{1}{2}$  miles west of Kawene and at mile-post 124 from Port Arthur.
- 61 E In north face—near west end—of exposed rock surface about 70 feet long and 10 feet south of Canadian Northern railway track,  $\frac{1}{2}$  mile east of Kawene and 220 feet west of mile-post 121 from Port Arthur.
- 62 E In north side of rock cut on Canadian Northern railway—40 feet from east end of cut—at west end of a fill extending across a small bay of Mink lake, and at mile-post 117 from Port Arthur.
- 63 E In south side of rock cut on Canadian Northern railway—50 feet from west end of cut—at mile-post 113 from Port Arthur, on a very sharp curve.
- 64 E In south side of rock cut on Canadian Northern railway—near centre of cut— $1\frac{1}{2}$  miles west of Windigo and between first and second telegraph poles west of mile-post 108 from Port Arthur.
- 65 E In southwest face of exposed rock surface, 70 feet north of Canadian Northern railway track,  $2\frac{1}{2}$  miles east of Windigo and between second and third telegraph poles east of mile-post 104 from Port Arthur.

- 66 E. In north face of exposed rock surface at west end of a rock cut, 10 feet south of Canadian Northern railway track,  $2\frac{1}{2}$  miles west of Huronian and 64 feet east of mile-post 100 from Port Arthur.
- 67 E. In concrete bench-mark pier, 32 feet north of Canadian Northern railway track, 210 feet west of Huronian east mile-board and 235 feet east of mile-post 96 from Port Arthur.
- 68 E. In north face of exposed rock surface, 70 feet south of Canadian Northern railway track,  $\frac{1}{2}$  mile west of Keego section-house and 115 feet west of mile-post 92 from Port Arthur.
- 69 E. In south side of large rock cut on Canadian Northern railway—80 feet from west end of cut—at sixth telegraph pole east of mile-post 89 from Port Arthur.
- 70 E. In north face of exposed rock surface in a bank of earth, 20 feet south of Canadian Northern railway track, 580 feet east of a bridge over a creek and 250 feet east of mile-post 85 from Port Arthur.
- 71 E. In west face of northeast concrete retaining wall—6 inches above bridge-seat and 10 inches from north end of retaining wall—of Canadian Northern railway bridge over Kashabowi river,  $1\frac{1}{2}$  miles east of Kashabowi.
- 72 E. In north face of large boulder, 60 feet south of Canadian Northern railway track, 500 feet west of a section-house and directly behind a hand-car house—opposite mile-post 78 from Port Arthur.
- 73 E. In south side of rock cut on Canadian Northern railway—near centre of cut—between third and fourth telegraph poles east of mile-post 75 from Port Arthur.
- 74 E. In north face of large boulder, 45 feet south of Canadian Northern railway track—facing a small lake—45 feet east of a spring flowing through a wooden culvert and between twelfth and thirteenth telegraph poles east of mile-post 71 from Port Arthur.
- 75 E. In east face of flat boulder, 45 feet north of Canadian Northern railway track, 150 feet west of mile-post 63 from Port Arthur and just at eastern extremity of (lower) lake Shebandowan.
- 76 E. In north face—14 inches below top—of concrete footing at northeast corner of coal chute at Mabella.
- 77 E. In south face of exposed rock surface, 7 feet north of Canadian Northern railway track,  $2\frac{1}{2}$  miles east of Mabella and 140 feet west of mile-post 56 from Port Arthur—immediately west of a deep cut through clay and shale.
- 78 E. In east face of small boulder, 30 feet south of Canadian Northern railway track and 230 feet east of mile-post 51 from Port Arthur.
- 79 E. In concrete bench-mark pier, 38 feet north of Canadian Northern railway track, 130 feet east of a wooden culvert and 6 feet west of first telegraph pole west of mile-post 47 from Port Arthur.
- 80 E. In exposed rock surface, 10 feet south of Canadian Northern railway track—at west end of a very sharp curve— $1\frac{1}{2}$  miles east of Mattawin and at second telegraph pole west of mile-post 43 from Port Arthur.
- 81 E. In east face of northwest retaining wall of small concrete culvert under Canadian Northern railway, in a deep fill,  $5\frac{1}{2}$  miles east of Mattawin and at mileage 39.4 from Port Arthur.
- 82 E. In north side of rock cut on Canadian Northern railway—near west end of cut—between eleventh and twelfth telegraph poles west of mile-post 35 from Port Arthur and opposite a point on Canadian Pacific railway 260 feet west of Kamishikwa west mile-board—the two railways being side by side at this point.
- 83 E. In north face—8 inches below top and 43 inches from east end—of concrete foundation of Canadian Northern railway water-tank, 300 feet east of Mokomon station.  
Note.—The superstructure of the tank has been burned down and only the foundation remains.

- 84-E In south side of rock cut on Canadian Northern railway—near centre of cut—300 feet west of the head of a waterfall on Kaministiquia river, at third telegraph pole east of Hume west mile-board and at fifth telegraph pole west of mile-post 28 from Port Arthur.
- 85-E In west face of concrete retaining wall behind east abutment of Canadian Northern railway bridge over an unused headrace, 450 feet east of bridge over Kaministiquia river and 1 mile west of Kakabeka Falls station. The bench-mark is 4 feet 2 inches above bridge-seat, 7 feet south of north end of retaining wall and midway between north and south girders of bridge.
- 86-E In south end of west concrete foundation wall—21 inches below brickwork—of general store and post-office at Stanley—opposite the station.
- 87-E In west end of south concrete foundation wall—21 inches below brickwork—of English church at Slate River.
- 88-E In concrete bench-mark pier, 9 feet north of south line of Canadian Northern railway right-of-way and at eleventh telegraph pole east of mile-post 11 from Port Arthur.
- 89-E In south face of corner stone at southwest corner—first course above doorsills—of ward IV fire-hall at Westfort.
- 90-E In third course of stonework below brickwork, in south face of corner stone at southeast corner of one-story extension at south side of Fort William post-office.
- 91-E In eleventh course of stonework below brickwork, in east face of corner stone at southeast corner of Fort William city-hall.
- 92-E In first course of stonework below brickwork, in north (or end) wall of Canadian Pacific station-house at Fort William, 7 feet 3 inches from pilaster at northwest corner.
- 93-E In second course of stonework below brickwork, in north end of front (or west) wall of Canadian Northern station-house, Port Arthur.
- 94-E In first course of stonework above concrete sidewalk, in south (or Arthur street) wall—6 feet 4 inches from southeast corner—of Prince Arthur hotel, Port Arthur.
- 95-E In south stone foundation wall of Port Arthur post-office, at the corner of Arthur street and Court street north. The bench-mark is 2 feet 6 inches below brickwork and in the first stone east of central basement window.

BENCH-MARKS BETWEEN STANLEY AND NORTH LAKE, ONT.,  
VIA CANADIAN NORTHERN RAILWAY.

- 96-E In small boulder, 10 feet south of Canadian Northern railway track and between second and third telegraph poles west of bridge over Whitefish river,  $5\frac{1}{2}$  miles west of Stanley.
- 97-E In southwest face of northwest concrete retaining wall—5 feet below bridge-seat—of highway bridge over Whitefish river, 570 feet south of Canadian Northern railway track at Hymer.
- 98-E In south side of rock cut on Canadian Northern railway—25 feet from east end of cut—130 feet east of bridge over Whitefish river 4 miles west of Hymer.
- 99-E In north face of flat boulder, 13 feet south of north line of Canadian Northern railway right-of-way and between sixth and seventh telegraph poles west of station at Silver Mountain.
- 100-E In south face of exposed rock surface, 18 feet north of Canadian Northern railway track,  $\frac{1}{2}$  mile west of Whitefish and 25 feet west of mile-post 24 from Stanley.

- 101 E In south side of shallow rock cut on Canadian Northern railway, 5 miles west of Whitefish and at third telegraph pole west of mile-post 28 from Stanley
- 102 E In concrete bench-mark pier, 25 feet south of Canadian Northern railway track, 100 feet west of east end of a borrow pit on north side of track, and between ninth and tenth telegraph poles west of mile-post 32 from Stanley
- 103 E In south face of exposed rock surface, 20 feet north of Canadian Northern railway track and 120 feet west of mile-post 39 from Stanley.
- 104 E In south side of small rock cut on Canadian Northern railway—near east end of cut—5½ miles east of North Lake and at fifth telegraph pole east of mile-post 45 from Stanley.
- 105 E In north face of exposed rock surface, 7 feet south of Canadian Northern railway track—directly below large prominent boulder on top of bank—2½ miles east of North Lake and at fifth telegraph pole east of mile-post 48 from Stanley.
- 106 E In north face of concrete pier (built originally for astronomical observations), 55 feet south of Canadian Northern railway track and 100 feet west of North Lake station.

BENCH-MARKS BETWEEN WAINWRIGHT AND EDMONTON, ALTA.,  
VIA GRAND TRUNK PACIFIC RAILWAY.

- 37 H In south face of southeast concrete retaining wall of Grand Trunk Pacific railway (steel trestle) viaduct over Battle river, 3 miles west of Fabyan. The bench-mark is in vertical face of retaining wall, 2 feet below bottom of sloping portion.
- 38 H In concrete foundation—3 inches below woodwork and 2 feet 6 inches to the left of the spout—of Grand Trunk Pacific water-tank, 2½ miles east of Irma.
- 39 H In north concrete foundation wall—4 inches below galvanized iron sheeting and 8 inches from northeast corner—of engine house of Alberta Co-operative Elevator company's elevator (local No. 89) at Irma.
- 40 H In concrete bench-mark pier, 7 feet south of north line of Grand Trunk Pacific railway right-of-way, 130 feet west of west line of a highway crossing, 1 mile east of Jarrow and between second and third telegraph poles east of mile-post 691 from Winnipeg.
- 41 H In south face of small boulder, 37 feet south of north line of Grand Trunk Pacific railway right-of-way, 1½ miles west of Kinsella and 8 feet west of second telegraph pole west of mile-post 700 from Winnipeg (the fourth pole east of a highway crossing).
- 42 H In concrete foundation—3 inches below woodwork and 3 feet to the left of the spout—of Grand Trunk Pacific water-tank at Philips.
- 43 H In south concrete foundation wall—3 feet 7 inches below brickwork and 14 inches from southeast corner of Viking public school.
- 44 H In concrete bench-mark pier, 5 feet south of north line of Grand Trunk Pacific railway right-of-way, 1 mile east of Nestor, 21 feet west of mile-post 717 from Winnipeg and 115 feet east of a whistle-post for west-bound trains.
- 45 H In south concrete foundation wall—2 inches below woodwork and 17 inches from southwest corner—of Security Elevator company's elevator at Bruce.

- 46-H In east concrete foundation wall—4 feet 6 inches below brickwork and 22 inches from southeast corner—of Holden public school.
- 47-H In west face of concrete steps at front entrance to Ryley public school. The bench-mark is 6 inches below top of top step and 15 inches south of south wall of building.
- 48-H In south face of concrete pier supporting lever for interlocking plant—at south side of Grand Trunk Pacific railway track—and at first semaphore west of diamond crossing of Canadian Northern railway,  $\frac{1}{2}$  mile west of Ryley station.
- 49-H In concrete foundation—4 inches below woodwork and 40 inches to the right of the spout—of Grand Trunk Pacific water-tank, 1 mile east of Shonts.
- 50-H In rear (or north) concrete foundation wall—7 inches below woodwork and 30 feet from northeast corner—of Grand Trunk Pacific station-house at Tofield.
- 51-H In south concrete foundation wall—1 foot below galvanized iron sheeting and 1 foot from southeast corner—of town-hall and fire-station at Tofield.
- 52-H In concrete bench-mark pier, 55 feet south of north line of Grand Trunk Pacific railway right-of-way, 460 feet east of east end of a timber bridge and 23 feet east of second telegraph pole east of mile-post 760 from Winnipeg.
- 53-H In concrete foundation—4 inches below woodwork and 12 feet 6 inches to the right of the spout—of Grand Trunk Pacific water-tank at Cooking Lake.
- 54-H In concrete bench-mark pier, 9 feet south of north line of Grand Trunk Pacific railway right-of-way, 70 feet east of a farm crossing and 28 feet east of third telegraph pole east of mile-post 772 from Winnipeg.
- 55-H In east concrete foundation wall—3 inches below woodwork and 13 inches from northeast corner—of Grand Trunk Pacific railway section-house, at west end of passing-track at Ardrossan.
- 56-H In concrete bench-mark pier, 62 feet south of north line of Grand Trunk Pacific railway right-of-way, 108 feet east of a farm crossing,  $6\frac{1}{2}$  miles west of Ardrossan and 25 feet west of fifth telegraph pole west of mile-post 783 from Winnipeg.
- 57-H In west face of concrete retaining wall behind east abutment—3 feet 10 inches above bridge-seat and 4 feet 6 inches south of southerly girder—of Grand Trunk Pacific railway bridge over North Saskatchewan river, 6 miles east of Edmonton.
- 58-H In first course of sandstone above granite foundation wall, in north end of front (or east) wall of Edmonton court-house.
- 59-H In second course of stonework above concrete sidewalk, in west wall of Edmonton post-office, 4 feet south of south wall of clock tower.
- 60-H In east end of south face of concrete retaining wall behind north abutment of high-level bridge over North Saskatchewan river at Edmonton. The bench-mark is 4 feet below the rails of the street railway.
- 61-H In first course of stonework above ground, in west end of south wall of westerly wing of Provincial Parliament buildings at Edmonton. The bench-mark is 13 feet east of the three arches forming the western entrance to the buildings.

BENCH-MARKS BETWEEN CALGARY AND TOFIELD, ALTA.,  
VIA GRAND TRUNK PACIFIC RAILWAY.

- 39-F In south end of west face of concrete retaining wall behind east abutment—9 inches above bridge-seat—of Grand Trunk Pacific railway bridge over Elbow river,  $\frac{1}{2}$  mile east of Calgary city-hall.

- 40-F In north end of west face of concrete retaining wall behind east abutment of Grand Trunk Pacific railway bridge over Bow river,  $3\frac{1}{2}$  miles east of Calgary city-hall.
- 41-F In east concrete foundation wall—8 inches below brickwork and 17 inches from southeast corner—of Buckeye Machine company's shop, a large brick building immediately west of Grand Trunk Pacific railway and  $\frac{1}{2}$  mile north of Hualta station.
- 42-F In concrete bench-mark pier, 7 feet east of west line of Grand Trunk Pacific railway right-of-way, 340 feet north of a timber subway and between first and second telegraph poles south of mile-post 186 from Tofield.
- 43-F In east end of south face of concrete retaining wall behind north abutment—20 inches above bridge-seat—of plate-girder bridge on Grand Trunk Pacific railway, 2 miles north of Delacour and at mileage 181.2 from Tofield.
- 44-F In north end of east face of square concrete culvert under Grand Trunk Pacific railway,  $\frac{1}{2}$  mile north of Kathryn and at mileage 177.1 from Tofield.
- 45-F In centre of west face of square concrete culvert under Grand Trunk Pacific railway, at mileage 174.2 from Tofield.
- 46-F In centre of east face of square concrete culvert under Grand Trunk Pacific railway,  $2\frac{1}{2}$  miles south of Irricana and at mileage 171.1 from Tofield.
- 47-F In west face of concrete retaining wall behind south abutment of bridge by which Grand Trunk Pacific railway passes over Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Beiseker. The bench-mark is 2 feet 9 inches below Grand Trunk Pacific rails.
- 48-F In south concrete foundation wall—2 inches below galvanized iron sheeting and 3 feet 6 inches from southwest corner—of Alberta Co-operative Elevator company's elevator (local No. 45) at Beiseker.
- 49-F In concrete bench-mark pier, 5 feet west of east line of Grand Trunk Pacific railway right-of-way, 100 feet south of a farm crossing and opposite third telegraph pole north of mile-post 155 from Tofield.
- 50-F In south concrete foundation wall—3 inches below galvanized iron sheeting and 8 inches from southwest corner—of Alberta-Pacific Grain company's elevator at Grainger.
- 51-F In west concrete foundation wall—19 inches below galvanized iron sheeting and 8 feet from southwest corner—of Alberta Co-operative Elevator company's elevator (local No. 48) at Swalwell.
- 52-F In west face of concrete footing—7 inches below woodwork and 40 inches to the right of the spout—of Grand Trunk Pacific water-tank, 1 mile north of Twining.
- 53-F In west concrete foundation wall—6 inches below galvanized iron sheeting and 2 feet from northwest corner—of engine house of Alberta-Pacific Grain company's elevator at Three Hills.
- 54-F In concrete bench-mark pier, 5 feet east of west line of Grand Trunk Pacific railway right-of-way,  $3\frac{1}{2}$  miles north of Three Hills and 12 feet north of mile-post 128 from Tofield.
- 55-F In west concrete foundation wall—2 feet below brickwork and 1 foot from southwest corner—of front (or westerly) section of Roman Catholic school at Trochu,  $\frac{1}{2}$  mile southeast of the station.
- 56-F In concrete bench-mark pier, 4 feet east of west line of Grand Trunk Pacific railway right-of-way, 15 feet south of a private crossing  $1\frac{1}{2}$  miles north of Huxley, and between third and fourth telegraph poles north of mile-post 113 from Tofield.
- 57-F In concrete bench-mark pier, 4 feet east of west line of Grand Trunk Pacific railway right-of-way, 200 feet south of a short deep clay cut, 4 miles north of Elnora and 60 feet south of mile-post 105 from Tofield.

- 58 F In west face of boulder at northwest corner—forming part of foundation—of J. W. Smith's general store at Lousana, 600 feet east of the station.
- 59 F In east concrete foundation wall—4 inches below galvanized iron sheeting and 9 inches from northeast corner—of engine house of Alberta Co-operative Elevator company's elevator (local No. 64) at Delburne.
- 60 F In concrete bench-mark pier, 3 feet east of west line of Grand Trunk Pacific railway right-of-way, at fourth telegraph pole north of a highway crossing and at second pole south of mile-post 85 from Tofield—1 mile south of bridge over Red Deer river.
- 61 F In southwest face of concrete footing of bridge by which Canadian Northern railway passes over Grand Trunk Pacific railway,  $\frac{1}{2}$  mile south of Grand Trunk Pacific station at Alix and 500 feet southwest of Canadian Northern station at Alix. The footing referred to is under a steel upright at north side of bridge and to the east of the Grand Trunk Pacific railway track.
- 62 F In west concrete foundation wall—12 inches below woodwork and 14 inches from northwest corner—of signal tower at diamond crossing of Grand Trunk Pacific and Canadian Pacific railways,  $\frac{1}{2}$  mile north of Grand Trunk Pacific station at Alix.
- 63 F In concrete foundation—10 inches below woodwork and 2 feet to the right of the spout—of Grand Trunk Pacific water-tank at Mirror.
- 64 F In concrete bench-mark pier, 4 feet east of west line of Grand Trunk Pacific railway right-of-way, 6 miles north of Mirror and at first telegraph pole south of mile-post 65 from Tofield.
- 65 F In west concrete foundation wall—21 inches below galvanized iron sheeting and 7 inches from northwest corner—of Alberta Co-operative Elevator company's elevator (local No. 67) at Bashaw.
- 66 F In south concrete foundation wall—7 inches below woodwork and 11 inches from southeast corner—of Strom Brothers' general store at Dorenee, 500 feet northwest of the station.
- 67 F In north concrete foundation wall—5 inches below galvanized iron sheeting and 3 feet 8 inches from northeast corner—of Imperial Elevator and Lumber company's engine house at Ferintosh.
- 68 F In south concrete foundation wall—4 inches below galvanized iron sheeting and 2 feet from southwest corner—of Pioneer Grain company's elevator at New Norway.
- 69 F In concrete bench-mark pier, 4 feet west of east line of Grand Trunk Pacific railway right-of-way, at eighth telegraph pole south of south end of trestle bridge over Battle river and at seventh pole north of mile-post 34 from Tofield.
- 70 F In bevelled northwest corner—7 inches below top—of concrete foundation of signal tower at diamond crossing of Grand Trunk Pacific and Canadian Pacific railways, 800 feet north of Grand Trunk Pacific station at Camrose.
- 71 F In north wall of Camrose high school, in north face of concrete sill of fourth basement window from northeast corner of building.
- 72 F In northwest concrete foundation wall—3 inches below woodwork and 5 feet from west corner—of signal tower at diamond crossing of Grand Trunk Pacific and Canadian Northern railways,  $2\frac{1}{2}$  miles north of Camrose.
- 73 F In west face of concrete footing—4 inches below woodwork and 3 feet 6 inches to the right of the spout—of Grand Trunk Pacific water-tank,  $\frac{1}{2}$  mile south of Dinant.
- 74 F In concrete bench-mark pier, 4 feet east of west line of Grand Trunk Pacific railway right-of-way, 1 mile south of Kingman and 35 feet north of a private crossing at mile-post 13 from Tofield.



- 75 F In concrete bench-mark pier, 6 feet east of west line of Grand Trunk Pacific railway right-of-way and 150 feet south of south line of a highway crossing at mile-post 7 from Tofield.
- 76 F In west face of concrete footing—3 inches below woodwork and 3 feet 6 inches to the left of the spout—of Grand Trunk Pacific water-tank,  $1\frac{1}{2}$  miles south of Tofield.
- 50-H In Grand Trunk Pacific station, Tofield—see line from Wainwright to Edmonton.

BENCH-MARKS BETWEEN CALGARY, ALTA., AND FIELD, B.C.,  
VIA CANADIAN PACIFIC RAILWAY.

- 217 C In second course of stonework above concrete platform, in south end of west wall of Canadian Pacific station at Calgary—40 feet east of east wall of Palliser hotel.
- 218 C In south face of concrete retaining wall of subway by which Eighth street west passes under Canadian Pacific railway in Calgary. The wall referred to lies along the east side of the street, north of the railway; the bench-mark is 6 inches below top of concrete and 17 inches north of north railing of bridge.
- 219 C In first course of stonework below bridge-seat, in west face of west abutment of Canadian Pacific railway bridge over westerly channel of Bow river, at mileage 7.8 from Calgary. The bench-mark is directly in line with the southerly truss.
- 220 C In west end of south face of square concrete culvert under Canadian Pacific railway at mileage 12.3 from Calgary—at a gravel-washing plant.
- 221 C In east end of north face of square concrete culvert under Canadian Pacific railway at mileage 15.6 from Calgary.
- 222 C In south concrete foundation wall—2 feet 10 inches below brickwork and 2 feet from southeast corner—of front (or southerly) section of Cochrane public school.
- 223 C In south end of east face—8 inches below top—of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $\frac{1}{2}$  mile west of Cochrane and at mileage 23.6 from Calgary.
- 224 C In north face—20 inches from west end—of concrete coping on northeast retaining wall of Canadian Pacific railway bridge over Bow river, 3 miles west of Cochrane and at mileage 25.7 from Calgary.
- 225 C In concrete bench-mark pier, 7 feet south of north line of Canadian Pacific railway right-of-way,  $\frac{1}{2}$  mile east of Radnor and 1,315 feet west of mile-post 32 from Calgary.
- 226 C In east face of north face-wall of square concrete culvert under Canadian Pacific railway, 2 miles east of Morley and at twelfth telegraph pole east of mile-post 40 from Calgary.
- 227 C In concrete bench-mark pier, 5 feet south of north line of Canadian Pacific railway right-of-way, 50 feet west of mile-post 43 from Calgary and 135 feet west of Morley west mile-board.
- 228 C In east face of large flat boulder, 30 feet north of Canadian Pacific railway track and between second and third telegraph poles east of mile-post 50 from Calgary.
- 229 C In south face of west concrete abutment—20 inches below bridge-seat—of Canadian Pacific railway bridge over Kananaskis river,  $\frac{1}{2}$  mile east of Seebe and at mileage 51.9 from Calgary.
- 230 C In north face of west concrete abutment—20 inches below bridge-seat—of Canadian Pacific railway bridge over Bow river, 1 mile west of Seebe.
- 231 C In north end of west face of concrete retaining wall behind east abutment—3 feet above bridge-seat—of plate-girder bridge on Canadian Pacific railway, at east end of Exshaw passing track.

- 232 C In west end of south face of concrete arch culvert under Canadian Pacific railway,  $3\frac{1}{2}$  miles west of Exshaw and at mileage 60.5 from Calgary.
- 233 C In west face of northeast retaining wall of square concrete culvert under Canadian Pacific railway at mileage 61.6 from Calgary.
- 234 C In east face—8 inches below top—of south face-wall of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Canmore and at mileage 65.6 from Calgary.
- 235 C In east face of north face-wall of double concrete culvert under Canadian Pacific railway, 1,150 feet east of Canmore station.
- 236 C In east face of north face-wall of double concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Canmore and at mileage 69.6 from Calgary.
- 237 C In north end of west face of concrete retaining wall behind east abutment—31 inches above bridge-seat—of plate-girder bridge on Canadian Pacific railway, at mileage 73.1 from Calgary.
- 238 C In east face of south face-wall of triple concrete culvert under Canadian Pacific railway, 1 mile east of Anthracite and at mileage 76.2 from Calgary.
- 239 C In first course of stonework below bridge-seat, in south face of east abutment of steel truss bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Bankhead and at mileage 78.3 from Calgary.
- 240 C In north end of west face of concrete retaining wall behind east abutment—21 inches above bridge-seat—of plate-girder bridge on Canadian Pacific railway, immediately west of Banff.
- 241 C In west wall of Banff public school, in west face of concrete sill of fifth basement window south of northerly entrance.
- 242 C In concrete bench-mark pier, 95 feet north of Canadian Pacific railway track, 1 mile west of Sawback and 110 feet west of mile-post 89 from Calgary—opposite a point where an inlet from the Bow river lies close beside the railway.
- 243 C In southeast face of southwest concrete retaining wall—17 inches above bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Mount Castle station and at mileage 96.3 from Calgary.
- 244 C In east end of south face of north concrete abutment of highway bridge over Bow river,  $1\frac{1}{2}$  miles west of Mount Castle station and  $\frac{1}{2}$  mile south of Canadian Pacific railway—at a point opposite mile-post 100 from Calgary.
- 245 C In east face of north face-wall of square concrete culvert under Canadian Pacific railway, 470 feet east of east switch at Eldon passing-track and at mileage 106.1 from Calgary.
- 246 C In north end of west face of concrete retaining wall behind east abutment—26 inches above bridge-seat—of Canadian Pacific railway bridge over Baker brook, at mileage 108.4 from Calgary.
- 247 C In west end of south face of double concrete culvert under Canadian Pacific railway, 3 miles east of Lake Louise station and at mileage 113.5 from Calgary.
- 248 C In second course of stonework above bridge-seat, in south end of east face of retaining wall behind west abutment of two-span plate-girder bridge on Canadian Pacific railway,  $\frac{1}{2}$  mile east of Lake Louise station.
- 249 C In first course of stonework above water-table course, in rear (or east) wall—8 feet 6 inches from southeast corner—of Canadian Pacific roundhouse at Lake Louise station.
- 250 C In north face of west concrete abutment—4 feet below bridge-seat—of Canadian Pacific railway bridge over Bath creek,  $1\frac{1}{2}$  miles west of Lake Louise station and at mileage 117.8 from Calgary.

- 251 C In south end of east face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, at mileage 121.2 from Calgary.
- 252 C In north face of concrete base of interprovincial boundary monument between Alberta and British Columbia, 110 feet south of Canadian Pacific railway track at "The Great Divide"—immediately east of Stephen passing-track.
- 253 C In south end of east face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, 200 feet west of Hector station.
- 254 C In north end of west face—11 inches below top—of concrete retaining wall behind west abutment of Canadian Pacific railway bridge over Kicking Horse river, 1 mile west of Hector and at mileage 125.9 from Calgary.
- 255 C In face of concrete head-wall at lower portal of "No. 1" spiral tunnel (the first tunnel west of Hector)—20 inches to the left of the entrance and 18 inches above rail level.
- 256 C In south end of east face—1 foot below top—of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over Kicking Horse river, at mileage 130.6 from Calgary—between "No. 1" and "No. 2" spiral tunnels. (It is assumed at this point that the railway runs in an easterly direction going towards Field.)
- 257 C In west face of northeast concrete retaining wall—5 feet above bridge-seat—of three-span bridge over Kicking Horse river, 460 feet west of lower portal of "No. 2" spiral tunnel and at mileage 131.7 from Calgary.
- 258 C In north face of concrete lining of south wall of "No. 3" tunnel,  $3\frac{1}{2}$  miles east of Field and at mileage 133.2 from Calgary. The bench-mark is 22 inches from west (or lower) portal and 6 inches above rail level.
- 259-C In east face of north face-wall of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Field and at mileage 135.4 from Calgary.
- 260-C In north concrete wall of Canadian Pacific roundhouse at Field; the bench-mark is 2 feet above ground and 10 feet from northeast corner of building or from entrance to first engine stall.

BENCH-MARKS BETWEEN VANCOUVER, B.C., AND BLAINE, WASH.,  
VIA GREAT NORTHERN RAILWAY.

- 1 J In first course of stonework above concrete sidewalk, in west wall of front portico of Canadian Pacific station at Vancouver, 30 inches south of main front wall of building and 95 feet east of east line of Granville street.
- 2 J In first course of stonework above pavement (of lane running off Granville street), in north wall of Vancouver post-office, 38 inches from northeast corner.
- 3 J In second course of stonework below water-table course, in rear (or south) wall—4 feet from southeast corner of Carnegie public library, at corner of Main and Hastings streets, Vancouver.
- 4 J In water-table course of stonework, in east wall—26 feet from southeast corner—of fire-hall No. 1, at corner of Cordova street and Gore avenue, Vancouver.
- 5 J In southeast face—4 feet 6 inches below top—of concrete footing of bridge by which Broadway Drive passes over Great Northern railway about  $2\frac{1}{2}$  miles southeast of Vancouver station. The footing referred to is under a steel upright at east side of bridge and on northeast side of railway.

- 6 J In south wall (facing Great Northern railway track) of Western Canada Power company's transformer station, a concrete building immediately east of diamond crossing of British Columbia Electric railway near Ardley. The bench-mark is in base of first concrete pilaster from southeast corner of building
- 7 J In south face of west abutment-wall of square concrete culvert under Great Northern railway, 580 feet east of diamond crossing of British Columbia Electric railway near Ardley
- 8 J In south face of concrete footing of Great Northern railway's northerly semaphore at Sapperton—120 feet north of a highway crossing.
- 9 J In south face of northeast concrete retaining wall of combined highway and railway bridge over Fraser river at New Westminster. The bench-mark is at the north end of the steel trestle approach carrying the highway, and is 13 feet from east face of north abutment and below the level of the bridge-seat.
- 10 J In south face of large block of granite at base of pilaster at southwest corner of New Westminster city-hall
- 11 J In first course of stonework above water-table course, in west wall of New Westminster post-office, beneath second window from southwest corner
- 12 J In first course of stonework below water-table course, in east wall of New Westminster court-house, 14 feet 6 inches from southeast corner. This is the northerly, or old section of the building, immediately north of the new section.
- 13-J In stone foundation of front (or south) wall of Canadian Pacific station-house at New Westminster, 3 feet 1 inch below brickwork and 4 feet 6 inches from southwest corner.
- 14 J In north face of large boulder immediately west of west line of Great Northern railway right-of-way, 200 feet north of mile-post 137 from Seattle and 20 feet south of a gate in right-of-way fence—at a diagonal highway crossing  $\frac{1}{4}$  mile north of Townsend
- 15-J In south face of boulder 20 feet east of Great Northern railway track, 630 feet north of an overhead (highway) bridge and 2 miles south of Townsend.
- 16-J In west face of large mass of rock on sea beach, 35 feet west of Great Northern railway track, about 2,700 feet south of mile-post 127 from Seattle and  $\frac{1}{4}$  mile south of Crescent flag-station.
- 17-J In west face of north abutment—3 feet below top—of square concrete culvert under Great Northern railway, 720 feet north of Whiterock station.
- 18 J In west face of very large granite boulder—the "white rock"—on sea beach,  $\frac{1}{4}$  mile south of Whiterock station.
- 19 J In concrete bench-mark pier at international boundary, 40 feet east of Great Northern railway track, 7 feet west of boundary monument No. 5, and  $\frac{1}{4}$  mile north of Blaine station.

BENCH-MARKS BETWEEN COLEBROOK AND HUNTINGDON, B.C.,  
VIA GREAT NORTHERN RAILWAY.

- 20-J In east stone foundation wall—5 feet below top of masonry and 10 feet from southeast corner—of municipal hall at Cloverdale.
- 21-J In south concrete wall of British Columbia Electric railway company's transformer station at Cloverdale, 17 inches below top of concrete plinth and 1 foot from southwest corner of building.
- 22-J In south face of southwesterly stone footing under water-tank of Great Northern railway at Lincoln.

- 23 J In east concrete foundation wall - 4 feet 6 inches below woodwork and 3 feet 9 inches from northeast corner of public school at Murrayville.
- 24 J In east concrete foundation wall - 4 feet 6 inches below woodwork and 4 feet 2 inches from northeast corner of public school at Aldergrove.
- 25 J In concrete bench-mark pair, 47 feet south of Great Northern railway track,  $1\frac{1}{4}$  miles west of Abbotsford, 580 feet east of a subway and 1,215 feet west of mile-post 31 from Colebrook.
- 26 J In east concrete foundation wall - 5 feet 4 inches below woodwork and 3 feet 5 inches from southeast corner of public school at Huntingdon.
- 27 J In north face of concrete base of international boundary monument No. 32,  $\frac{1}{4}$  mile east of Great Northern railway at Huntingdon.

TABLE II.  
RESULTS OF PRECISE LEVELLING  
HALIFAX, N.S., TO MONCTON, N.B.

BENCH-MARK.		Distance between successive bench marks	Distance from bench mark 386 B	DISCREPANCY		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles	Feet	Feet	Feet.	No.
	† 386 B					12 500	† 1
386 B	387 B	1.0	1.0	+ 013	013	60 743	386 B
						21 575	387 B
386 B	388 B	2.9	2.9	+ 014	014	40 963	388 B
388 B	MXXXIX	1.1	4.0	+ 011	025	13 730	MXXXIX
MXXXIX	MXXX	2.6	6.6	+ 018	043	15 032	MXXX
MXXX	MXXXI	1.1	7.7	+ 008	035	26 371	MXXXI
MXXXI	MXXXII	0.7	8.4	+ 004	039	45 998	MXXXII
MXXXII	506 B		8.4	+ 006	045	53 242	506 B
MXXXII	MXXXIII	1.4	9.8	+ 016	061	135 084	MXXXIII
MXXXIII	MXXXIV	2.8	12.6	+ 011	072	140 594	MXXXIV
MXXXIV	507 B	4.8	17.4	+ 035	006	261 570	507 B
507 B	508 B	3.0	20.4	+ 000	006	362 973	508 B
508 B	509 B	3.6	24.0	+ 001	007	458 033	509 B
509 B	510 B	3.2	27.2	+ 010	+ 003	505 799	510 B
510 B	511 B	3.0	30.2	+ 013	+ 016	439 222	511 B
511 B	512 B	3.5	33.7	+ 007	+ 023	408 569	512 B
512 B	513 B	1.8	35.5	+ 007	+ 030	312 469	513 B
513 B	514 B	2.5	38.0	+ 015	+ 045	174 353	514 B
514 B	515 B	2.7	40.7	+ 015	+ 000	79 085	515 B
515 B	505 B*	4.2	44.9	+ 002	+ 002	20 428	505 B*
505 B*	516 B	3.8	48.7	+ 001	+ 001	30 019	516 B
516 B	517 B	6.1	54.8	+ 025	+ 024	114 318	517 B
517 B	518 B	3.2	58.0	+ 010	+ 034	32 691	518 B
518 B	519 B	2.7	60.7	+ 018	+ 004	45 163	519 B
519 B	520 B	2.2	62.9	+ 016	+ 012	64 228	520 B
520 B	521 B	0.8	63.7	+ 002	+ 014	66 993	521 B
521 B	522 B	1.6	65.3	+ 018	+ 032	75 896	522 B
522 B	523 B	5.4	70.7	+ 019	+ 051	95 484	523 B
523 B	524 B	0.5	71.2	+ 004	+ 055	95 353	524 B

†Reference bench-mark, Department of the Naval Service.

\*See also elevation of this bench-mark on page 176.

## RESULTS OF PRECISE LEVELLING

HALIFAX, N.S., TO MONCTON, N.B. *Continued*

BENCH-MARK		Distance between successive marks	Distance from bench- mark 586 B	DISCREPANCY		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles	Feet	Feet	Feet	No.
524 B	525 B	2.0	73.2	+ .003	+ .058	103.270	525 B
525 B	526 B	2.1	75.3	+ .009	+ .067	112.386	526 B
526 B	527 B	5.5	80.8	+ .002	+ .069	122.876	527 B
527 B	528 B	1.5	84.3	+ .026	+ .043	52.486	528 B
528 B	529 B	1.9	86.2	+ .004	+ .017	39.638	529 B
529 B	530 B	6.6	92.8	+ .001	+ .048	153.182	530 B
530 B	531 B	2.9	95.7	+ .002	+ .046	30.851	531 B
531 B	532 B	5.0	100.7	+ .011	+ .057	34.280	532 B
532 B	533 B	1.1	101.8	+ .005	+ .002	41.420	533 B
533 B	MIII	0.7	102.5	+ .002	+ .000	57.107	MIII
MIII	534 B	0.7	103.2	+ .005	+ .055	51.629	534 B
534 B	535 B		103.2	+ .000	+ .055	51.662	535 B
535 B	536 B	0.2	103.4	+ .001	+ .054	57.085	536 B
536 B	537 B		103.4	+ .006	+ .048	63.687	537 B
537 B	CMLXVI A	0.4	103.8	+ .005	+ .043	54.923	CMLXVI A
CMLXVI A	CMLXVII	1.1	104.9	+ .004	+ .047	34.834	CMLXVII
CMLXVII	CMLXVIII	0.6	105.5	+ .008	+ .039	38.617	CMLXVIII
CMLXVIII	CMLXIX	1.4	106.9	+ .018	+ .057	82.057	CMLXIX
CMLXIX	CMLXX	1.4	108.3	+ .018	+ .039	82.691	CMLXX
CMLXX	CMLXXI	2.5	110.8	+ .005	+ .044	81.019	CMLXXI
CMLXXI	CMLXXII	0.8	111.6	+ .008	+ .036	92.260	CMLXXII
CMLXXII	CMLXXIII	1.8	113.4	+ .006	+ .030	151.470	CMLXXIII
CMLXXIII	CMLXXIV	1.5	114.9	+ .002	+ .028	145.497	CMLXXIV
CMLXXIV	CMLXXV	1.0	115.9	+ .002	+ .030	157.024	CMLXXV
CMLXXV	CMLXXVI	1.0	117.5	+ .014	+ .016	185.613	CMLXXVI
CMLXXVI	CMLXXVII	0.6	118.1	+ .011	+ .005	189.329	CMLXXVII
CMLXXVII	CMLXXVIII	2.2	120.3	+ .024	+ .029	324.695	CMLXXVIII
CMLXXVIII	CMLXXIX	1.0	122.2	+ .004	+ .033	383.595	CMLXXIX
CMLXXIX	CMLXXX	0.6	122.8	+ .012	+ .021	426.062	CMLXXX
CMLXXX	CMLXXXI	1.0	124.7	+ .011	+ .032	504.202	CMLXXXI
CMLXXXI	CMLXXXII	1.8	126.5	+ .008	+ .024	593.182	CMLXXXII
CMLXXXII	CMLXXXIII	0.2	126.7	+ .001	+ .025	605.584	CMLXXXIII
CMLXXXIII	538 B	0.9	127.6	+ .013	+ .042	615.857	538 B
538 B	539 B	0.6	128.2	+ .009	+ .021	608.920	539 B
539 B	CMLXXXIV	0.8	129.0	+ .013	+ .034	579.481	CMLXXXIV
CMLXXXIV	CMLXV	1.6	130.6	+ .004	+ .038	508.244	CMLXV
CMLXV	CMLXVI	0.8	131.4	+ .004	+ .034	466.596	CMLXVI
CMLXVI	CMLXVII	0.8	132.2	+ .001	+ .033	462.178	CMLXVII
CMLXVII	CMLXVIII	2.8	135.0	+ .010	+ .023	399.701	CMLXVIII
CMLXVIII	CMLXIX	2.1	137.1	+ .003	+ .020	320.172	CMLXIX
CMLXIX	CMLXX	0.8	137.9	+ .013	+ .033	285.647	CMLXX
CMLXX	CMLXXI	1.3	139.2	+ .019	+ .052	266.596	CMLXXI

## RESULTS OF PRECISE LEVELLING

HALIFAX, N.S., TO MONCTON, N.B. -Continued.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 386 B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
CMLVIII	CMLVII	1.3	140.5	-009	+043	238.431	CMLVII
CMLVII	CMLV	4.4	144.9	-032	+011	151.821	CMLV
CMLV	540 B	0.8	145.7	+011	+022	111.625	540 B
540 B	CMLIV	0.4	146.1	+005	+027	99.828	CMLIV
CMLIV	CMLIII	0.7	146.8	-005	+022	121.309	CMLIII
CMLIII	CMLII	1.1	147.9	+011	+033	103.283	CMLII
CMLII	CMLI	1.5	149.4	+019	+052	115.315	CMLI
CMLI	135 B*	1.2	150.6	-018	+034	89.824	135 B*
135 B*	CML	.....	150.6	-004	+030	89.645	CML
CML	541 B	0.7	151.3	+008	+038	133.203	541 B
541 B	542 B	1.4	152.7	-013	+025	167.406	542 B
542 B	CMXLVIII	0.4	153.1	-009	+016	149.453	CMXLVIII
CMXLVIII	CMXLVII	1.3	154.4	-003	+013	115.227	CMXLVII
CMXLVII	CMXLVI	1.3	155.7	+003	+016	148.957	CMXLVI
CMXLVI	CMV	1.4	157.1	+009	+025	129.861	CMV
CMV	CMVI	0.9	158.0	-000	+025	157.786	CMVI
CMVI	CMVII	1.6	159.6	+005	+030	231.478	CMVII
CMVII	CMVIII	1.4	161.0	+006	+036	261.832	CMVIII
CMVIII	CMIX	1.0	162.0	+001	+037	223.391	CMIX
CMIX	CMX	0.7	162.7	+011	+048	194.030	CMX
CMX	543 B	2.1	164.8	+016	+064	124.111	543 B
543 B	CMXI	0.8	165.6	-010	+054	93.688	CMXI
CMXI	CMXII	0.5	166.1	+006	+060	65.155	CMXII
CMXII	CMXIII	0.7	166.8	-014	+046	72.802	CMXIII
CMXIII	CMXIV	1.2	168.0	-005	+041	130.891	CMXIV
CMXIV	CMXV	1.6	169.6	+006	+047	85.482	CMXV
CMXV	CMXVI	2.3	171.9	+006	+053	33.560	CMXVI
CMXVI	CMXVII	1.9	173.8	-010	+043	28.652	CMXVII
CMXVII	CMXIX	2.2	176.0	-011	+032	28.556	CMXIX
CMXIX	CMXX	0.9	176.9	+002	+034	24.859	CMXX
CMXX	544 B	1.1	178.0	+017	+051	53.717	544 B
544 B	CMXXI	1.8	179.8	-019	+032	63.701	CMXXI
CMXXI	545 B	0.4	180.2	-005	+027	60.919	545 B
545 B	546 B	0.2	180.4	-002	+025	74.703	546 B
546 B	547 B	.....	180.4	-001	+024	77.653	547 B
547 B	548 B	0.2	180.6	-005	+019	77.364	548 B
548 B	CMIV	0.7	180.9	+010	+037	26.013	CMIV
CMIV	CM	1.7	182.6	-002	+035	26.601	CM

\*See introduction (this publication) page 141.



RESULTS OF PRECISE LEVELLING  
 HALIFAX N.S. TO MONCTON, N.B. - *Contd.*

BENCH-MARK		Distance from bench- mark	Distance from bench- mark	DISCREPANCY		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles	Feet	Feet	Feet	No.
CM	DCCCXCIX	0.8	183.4	-0.002	+0.033	30.856	DCCCXCIX
DCCCXCIX	DCCCXCVIII	5.4	188.8	+0.016	+0.049	26.188	DCCCXCVIII
DCCCXCVIII	MCCCCXXXVI	1.1	189.9	-0.006	+0.043	27.398	MCCCCXXXVI
MCCCCXXXVI	DCCCXCVII		189.9	0.002	0.041	19.038	DCCCXCVII
MCCCCXXXVI	CMII	0.7	190.6	+0.011	+0.054	86.762	CMII
CMII	CMIII		190.6	+0.004	+0.058	86.431	CMIII
CMIII	CMIII		190.6	+0.002	+0.060	74.421	CMIII
MCCCCXXXVI	DCCCXCVI	1.9	191.8	+0.014	+0.057	33.123	DCCCXCVI
DCCCXCVI	DCCCXCIV	2.0	193.8	-0.004	+0.053	113.349	DCCCXCIV
DCCCXCIV	DCCCXCIII	2.5	196.3	-0.014	+0.039	204.038	DCCCXCIII
DCCCXCIII	DCCCXCII	0.8	197.1	+0.010	+0.049	169.617	DCCCXCII
DCCCXCII	DCCCLXCI	1.0	198.1	-0.008	+0.041	124.430	DCCCLXCI
DCCCLXCI	DCCCLXXXIX	2.1	200.2	+0.006	+0.047	32.804	DCCCLXXXIX
DCCCLXXXIX	DCCCLXXXVIII	1.1	201.3	-0.013	+0.034	138.283	DCCCLXXXVIII
DCCCLXXXVIII	DCCCLXXXVII		201.3	-0.002	+0.032	126.371	DCCCLXXXVII
DCCCLXXXVIII	CCCLIV	2.8	204.1	+0.026	+0.060	28.105	CCCLIV
CCCLIV	CCCLV	3.0	207.1	+0.028	+0.088	28.119	CCCLV
CCCLV	549 B	2.5	209.6	-0.013	+0.075	22.035	549-B
549 B	CCCLVIII	1.9	211.5	+0.013	+0.098	31.086	CCCLVIII
CCCLVIII	CCCLVIII	1.1	212.6	+0.008	+0.096	25.124	CCCLVIII
CCCLVIII	CCCLX	1.0	213.6	+0.015	+0.111	42.370	CCCLX
CCCLX	CCCLXI	1.8	215.4	-0.001	+0.110	73.039	CCCLXI
CCCLXI	CCCLXIV	2.0	217.4	+0.021	+0.131	127.202	CCCLXIV
CCCLXIV	549 B	0.9	218.3	0.001	0.130	168.366	549 B
549 B	CCCLXV	0.8	219.1	+0.017	+0.147	157.047	CCCLXV
CCCLXV	MDXLIH	1.6	220.7	+0.006	+0.153	148.515	MDXLIH
MDXLIH	MDXLIV	1.4	222.1	-0.008	+0.145	126.358	MDXLIV
MDXLIV	MDXLV	0.9	223.0	+0.006	+0.151	120.467	MDXLV
MDXLV	MDXLVI	1.5	224.5	+0.008	+0.159	96.784	MDXLVI
MDXLVI	MDXLVII	2.3	226.8	-0.008	+0.151	40.821	MDXLVII
MDXLVII	132-B*	1.1	227.9	-0.004	+0.147	51.612	132-B*

\* The elevation of bench mark 132-B given on page 73, 1913 publication, is 51.413 - see introduction of this publication, page 140.

## RESULTS OF PRECISE LEVELLING.

## BRIDGEWATER TO WINDSOR, N.S.

BENCH-MARK.		Distance between successive bench- marks	Distance from bench- mark 411 B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles.	Feet	Feet	Feet.	No.
	411-B					44 491	411-B
411-B	466-B	2.0	2.0	- 012	- 012	64 411	466-B
466-B	467-B	3.3	5.3	+ 010	- 002	104 621	467-B
467-B	468-B	4.4	9.7	- 030	- 032	120 864	468-B
468-B	469-B	2.6	12.3	- 021	- 053	122 159	469-B
469-B	469-B-2	3.1	15.4	- 005	- 058	198 567	469-B-2
469-B-2	470-B	2.7	18.1	- 001	- 059	222 818	470-B
470-B	471-B	4.3	22.9	- 008	- 067	412 136	471-B
471-B	472-B	2.4	25.3	- 017	- 050	547 937	472-B
472-B	473-B	4.1	29.4	- 009	- 059	601 055	473-B
473-B	474-B	4.7	34.1	+ 005	- 054	613 138	474-B
474-B	475-B	3.4	37.5	- 020	- 074	574 971	475-B
475-B	476-B	2.6	40.1	- 012	- 086	577 027	476-B
476-B	476-B-2	1.0	41.1	- 001	- 087	579 046	476-B-2
476-B-2	477-B	0.8	41.9	- 003	- 090	567 329	477-B
477-B	478-B	3.8	45.7	+ 020	- 070	469 222	478-B
478-B	479-B	3.4	49.1	- 021	- 091	184 147	479-B
479-B	480-B	0.6	49.7	+ 013	- 078	151 282	480-B
480-B	481-B	2.8	52.5	+ 001	- 077	38 212	481-B
481-B	482-B	1.4	53.9	- 020	- 097	73 776	482-B
482-B	483-B	0.3	54.2	- 004	- 101	70 778	483-B
483-B	484-B	2.3	56.2	- 002	- 099	69 711	484-B
484-B	485-B	2.5	58.7	+ 011	- 088	52 741	485-B
485-B	486-B	2.5	61.2	+ 016	- 072	86 909	486-B
486-B	487-B	4.4	65.6	+ 006	- 066	83 551	487-B
487-B	488-B	7.2	72.8	+ 025	- 041	144 180	488-B
488-B	489-B	3.2	76.0	+ 017	- 024	81 983	489-B
489-B	490-B	2.3	78.3	+ 001	- 023	60 078	490-B
490-B	491-B	2.8	81.1	+ 010	- 013	57 238	491-B
491-B	492-B	4.1	85.2	- 013	- 026	39 252	492-B
492-B	493-B	0.2	85.4	- 000	- 026	42 332	493-B
493-B	494-B	0.4	85.8	- 009	- 035	23 253	494-B
494-B	494-B-2	5.3	91.1	+ 010	- 025	29 683	494-B-2
494-B-2	495-B	0.9	92.0	- 013	- 038	22 705	495-B
495-B	496-B	0.3	92.3	+ 004	- 034	28 826	496-B
496-B	497-B		92.3	+ 003	- 031	43 614	497-B
497-B	498-B	2.9	95.2	- 019	- 053	27 877	498-B

RESULTS OF PRECISE LEVELLING  
BRIDGEWATER TO WINDSOR, N.S. — *Continued*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 411-B.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial.	Total.		
No.	No.	Miles	Miles.	Feet.	Feet.	Feet.	No.
498-B	499-B	4.0	99.2	+ .002	— .051	71.085	499-B
499-B	500-B	3.9	103.1	— .008	— .059	49.230	500-B
500-B	501-B	2.2	105.3	— .010	— .069	47.628	501-B
501-B	502-B	4.3	109.6	+ .005	— .064	33.285	502-B
502-B	503-B	0.6	110.2	+ .001	— .063	38.063	503-B
503-B	504-B	.....	110.2	+ .001	— .062	41.811	504-B
503-B	505-B*	.....	110.2	+ .002	— .061	29.486	505-B*

\*See also elevation of this bench-mark on page 171.

RESULTS OF PRECISE LEVELLING.  
ST. LEONARD TO CAMPBELLTON, N.B.

BENCH-MARK.		Distance between successive bench-marks.	Distance from bench-mark 50-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
50-B	50-B					449.126	50-B
1-G	1-G	3.5	3.5	- .004	- .004	494.067	1-G
2-G	2-G	7.0	10.5	+ .001	- .003	555.985	2-G
3-G	3-G	3.7	14.2	+ .004	+ .001	602.125	3-G
4-G	4-G	0.2	14.4	+ .001	+ .002	603.766	4-G
5-G	5-G	4.3	18.7	+ .020	+ .022	667.317	5-G
6-G	6-G	6.1	24.8	+ .018	+ .040	724.485	6-G
7-G	7-G	5.4	30.2	- .001	+ .039	844.897	7-G
8-G	8-G	4.8	35.0	+ .012	+ .051	760.751	8-G
9-G	9-G	3.0	38.0	- .006	+ .045	910.979	9-G
10-G	10-G	5.6	43.6	+ .003	+ .048	830.483	10-G
11-G	11-G	2.3	45.9	+ .022	+ .070	920.650	11-G
12-G	12-G	8.5	54.4	- .011	+ .059	934.534	12-G
13-G	13-G	4.0	58.4	- .010	+ .049	935.544	13-G
14-G	14-G	2.3	60.7	- .004	+ .045	941.758	14-G
15-G	15-G	7.7	68.4	- .023	+ .022	1138.976	15-G
16-G	16-G	7.1	75.5	- .014	+ .008	857.251	16-G
17-G	17-G	3.0	78.5	+ .009	+ .017	691.656	17-G
18-G	18-G	2.8	81.3	+ .001	+ .018	518.950	18-G
19-G	19-G	2.1	83.4	- .020	- .002	433.647	19-G
20-G	20-G	3.0	86.4	+ .001	- .001	322.962	20-G
21-G	21-G	6.2	92.6	- .007	- .008	132.163	21-G
22-G	22-G	7.1	99.7	- .032	- .040	238.536	22-G
23-G	23-G	3.8	103.5	- .008	- .048	132.961	23-G
24-G	24-G	5.3	108.8	+ .004	- .044	127.521	24-G
25-G	25-G	1.9	110.7	+ .015	- .029	44.002	25-G
26-G	26-G	0.4	111.1	+ .001	- .028	26.425	26-G

Connections at Campbellton with Public Works Dept's bench-marks:—

B.M.—MDXLIX—I.R.C. station, Elev. 44.192

B.M.—MDL—Post-office, Elev. 26.415

B.M.—CCLXXVII—Bank of Nova Scotia, Elev. 23.050.

B.M.—CCLXXV—I.R.C. culvert, Elev. 43.123.

RESULTS OF PRECISE LEVELLING  
McGIVNEY JUNCTION TO CHATHAM, N.B.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 333-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	333-B					571.695	333-B
333-B	31-G	4.7	4.7	-000	-000	469.168	31-G
31-G	32-G	6.5	11.2	-037	-037	350.212	32-G
32-G	33-G	2.4	13.3	+003	-034	217.039	33-G
33-G	34-G	6.3	19.6	-005	-039	145.466	34-G
34-G	35-G	3.6	23.2	-001	-040	165.944	35-G
35-G	36-G	3.2	26.4	+022	-018	130.808	36-G
36-G	37-G	3.4	29.8	+009	-009	111.826	37-G
37-G	38-G	4.2	34.0	-007	-016	293.127	38-G
38-G	39-G	2.0	36.0	+004	-012	333.030	39-G
39-G	40-G	7.5	43.5	+032	+020	232.350	40-G
40-G	41-G	6.1	49.6	-029	-009	93.931	41-G
41-G	42-G	1.9	51.5	-001	-010	47.039	42-G
42-G	43-G	3.1	54.6	+003	-007	79.778	43-G
43-G	44-G	4.5	59.1	-019	-026	135.199	44-G
44-G	45-G	2.9	62.0	-005	-031	35.252	45-G
45-G	46-G	5.4	67.4	-002	-033	103.080	46-G
46-G	47-G	4.1	71.5	+029	-004	22.067	47-G
47-G	47-G 2	4.6	76.1	+006	+002	40.288	47-G 2
47-G 2	48-G	4.4	80.5	+019	+021	46.851	48-G
48-G	49-G	3.8	84.3	+026	+047	10.358	49-G

Connections with Public Works Dept's bench-marks—

B.M.—DCCCXXVI—Bridge at Derby Jct., Elev. 30.582.

B.M.—MCCCCXIII—Chatham post-office, Elev. 10.218.

B.M.—M'CCCCXII—Chatham Cathedral, Elev. 92.054.

## RESULTS OF PRECISE LEVELLING.

## ST. ANSELME TO LEVIS, QUE.

BENCH MARK.		Distance between successive bench- marks.	Distance from bench- mark 214-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	214-B					553.825	214-B
214-B	250-B	2.4	2.4	- .009	- .009	532.495	250-B
250-B	251-B	3.3	5.7	- .001	- .010	463.562	251-B
251-B	252-B	2.9	8.6	+ .020	+ .010	410.736	252-B
252-B	253-B	2.3	10.9	- .018	- .008	366.082	253-B
253-B	254-B	2.4	13.3	+ .005	- .003	338.878	254-B
254-B	255-B	1.9	15.2	- .012	- .015	313.568	255-B
255-B	256-B	4.2	19.4	- .024	- .039	248.949	256-B
256-B	257-B	2.9	22.3	- .012	- .051	207.238	257-B
257-B	258-B	2.1	24.4	- .011	- .062	169.643	258-B
258-B	259-B	1.9	26.3	+ .006	- .056	157.224	259-B
258-B	222-B*	7.2	31.6	- .025	- .087	17.062	222-B*

\*The elevation of bench-mark 222-B given on page 77, 1913 publication, is 17.038.

Connections between Chaudière Jet. and Levis with Public Works Dept's bench-marks:—

B.M.—MCLXXIII—I.R.C. culvert, Elev. 164.508.

B.M.—MCLXXIV—I.R.C. culvert, Elev. 88.948.

B.M.—MCLXXV—I.R.C. bridge, Elev. 65.444.

## RESULTS OF PRECISE LEVELLING.

COOKSHIRE, QUE., TO BEECHER FALLS, VT.

BENCH MARK.		Distance between successive bench- marks	Distance from bench- mark 10-A-3	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles	Feet.	Feet.	Feet.	No.
	10-A-3					770.911	10-A-3
10-A-3	551-B	3.8	3.8	+ .025	+ .025	801.414	551-B
551-B	552-B	3.5	7.3	- .004	+ .021	905.617	552-B
552-B	553-B	2.0	9.3	- .024	- .003	948.095	553-B
553-B	554-B	6.5	15.8	+ .021	+ .018	1355.881	554-B
554-B	555-B	2.7	18.5	- .006	+ .012	1542.868	555-B
555-B	556-B	6.2	24.7	+ .019	+ .03	1356.693	556-B
556-B	557-B	3.5	28.2	- .019	+ 0.	223.763	557-B
557-B	558-B	2.4	30.6	- .003	+ .009	1135.165	558-B
558-B	559-B	0.8	31.4	+ .009	+ .018	1121.751	559-B
559-B	560-B	3.2	34.6	- .010	+ .008	1088.402	560-B
560-B	561-B	0.7	35.3	+ .003	+ .014	1099.376	561-B
561-B	562-B	0.7	36.0	+ .004	+ .015	1102.626	562-B

## RESULTS OF PRECISE LEVELLING.

SUDBURY, ONT., TO SAULT STE. MARIE, MICH.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 454.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
454	454 567-A	0.2	0.2	+ .011	+ .011	845.151 859.395	454 567-A
454	568	2.0	2.0	+ .004	+ .004	849.569	568
568	569	4.4	6.4	+ .001	+ .005	875.515	569
569	570	3.0	9.4	- .029	- .024	789.776	570
570	571	3.3	12.7	+ .002	- .022	821.650	571
571	572	1.3	14.0	+ .010	- .012	785.975	572
572	573	2.2	16.2	- .004	- .016	791.351	573
573	574	1.0	17.2	+ .014	- .002	791.756	574
574	575	3.0	20.2	+ .010	+ .008	826.003	575
575	576	3.3	23.5	+ .003	+ .011	807.273	576
576	577	2.8	26.3	+ .002	+ .013	756.173	577
577	578	3.6	29.9	+ .030	+ .043	698.223	578
578	579	2.5	32.4	.000	+ .043	721.299	579
579	580	1.1	33.5	- .006	+ .037	722.801	580
580	581	4.3	37.8	- .006	+ .031	672.754	581
581	582	1.0	38.8	- .019	+ .012	699.383	582
582	583	4.0	42.8	+ .017	+ .029	684.949	583
583	584	2.0	44.8	+ .017	+ .046	685.290	584
584	585	3.7	48.5	+ .018	+ .064	665.548	585
585	586	0.8	49.3	- .009	+ .055	643.671	586
586	587	0.9	50.2	+ .015	+ .070	667.014	587
587	588	2.8	53.0	+ .011	+ .081	618.338	588
588	589	3.7	56.7	- .009	+ .072	614.431	589
589	590	1.5	58.2	- .008	+ .064	637.822	590
590	591	2.0	60.2	+ .001	+ .065	608.765	591
591	592	3.3	63.5	+ .015	+ .080	624.083	592
592	593	1.5	65.0	+ .005	+ .085	679.073	593
593	594	4.8	69.8	+ .003	+ .088	600.022	594
594	595	2.1	71.0	- .015	+ .073	605.275	595
595	596	3.1	75.0	+ .027	+ .100	633.210	596
596	597	4.0	79.0	- .020	+ .080	640.084	597
597	598	3.9	82.9	+ .010	+ .090	599.948	598
598	599	1.8	84.7	+ .019	+ .109	588.247	599
599	600	3.0	87.7	- .018	+ .091	600.160	600
600	601	2.0	89.7	- .006	+ .085	643.202	601
601	602	5.6	95.3	+ .037	+ .122	603.690	602
602	603	4.1	99.4	- .011	+ .111	627.748	603
603	604	3.3	102.7	- .022	+ .089	599.985	604
604	605	.....	102.7	.000	+ .089	600.891	605



## RESULTS OF PRECISE LEVELLING.

SUDBURY, ONT., TO SAULT STE. MARIE, MICH.—Continued

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 454.	DISCREPANCY		Elevation above mean sea level	BENCH-MARK
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
604	606	2.0	104.7	-.006	+.083	593.798	606
606	607	1.9	101.6	+.004	+.087	598.803	607
607	608	3.9	110.5	+.004	+.091	606.926	608
608	609	2.9	113.4	-.003	+.088	630.893	609
609	610	2.9	116.3	+.016	+.104	623.034	610
610	611	3.6	119.9	+.012	+.116	613.039	611
611	612	2.5	122.4	-.016	+.100	610.013	612
612	613	3.0	125.4	-.027	+.073	632.872	613
613	614	2.8	128.2	-.007	+.066	622.442	614
614	615	4.4	132.6	-.025	+.041	594.387	615
615	616	1.0	133.6	+.008	+.049	594.330	616
616	616-A	3.9	137.5	+.006	+.055	638.395	616-A
616-A	617	2.3	139.8	-.027	+.028	670.671	617
617	618	1.8	141.6	-.001	+.027	694.931	618
618	619	1.7	143.3	-.009	+.018	676.017	619
619	620	4.9	148.2	-.039	-.021	635.800	620
620	621	1.7	149.9	-.010	-.031	591.137	621
621	622	1.5	151.4	+.002	-.029	590.478	622
622	623	3.8	155.2	+.025	-.004	640.823	623
623	624	3.5	158.7	-.003	-.007	613.220	624
624	625	2.2	160.9	+.021	+.014	592.245	625
625	626	4.0	164.9	+.016	+.030	587.408	626
626	627	0.9	165.8	+.015	+.045	596.361	627
627	628	1.8	167.6	+.018	+.063	585.070	628
628	629	3.5	171.1	+.023	+.086	602.741	629
629	630	3.3	174.4	+.002	+.088	605.781	630
630	631	3.7	178.1	+.035	+.123	637.046	631
631	632	2.0	180.1	-.009	+.114	601.930	632
632	633	0.2	180.3	-.000	+.114	598.848	633
632	634	1.5	181.6	+.008	+.122	601.622	634
634	635	1.3	182.9	+.018	+.140	618.213	635
635	636	1.0	183.9	+.005	+.145	610.176	636

Connections at Sault Ste. Marie, Mich. with bench-marks of United States Lake Survey:—

P.B.M.A.—On Weitzel lock, Elev. 605.122.

P.B.M.B.—On Poe lock, Elev. 587.678

RESULTS OF PRECISE LEVELLING  
FORT FRANCES TO PORT ARTHUR, ONT.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench mark 3-C.	DISCREPANCY		Elevation above mean sea level.	BENCH-MARK
From	To			Partial	Total		
No	No.	Miles.	Miles	Feet	Feet.	Feet.	No.
	29-E		191.2		+ 292	1119.617	29-E
29-E	31-E	2.7	193.9	+ 018	+ 310	1117.185	31-E
31-E	32-E	4.2	198.1	+ 030	+ 340	1121.376	32-E
32-E	33-E	3.1	201.2	+ 003	+ 343	1119.267	33-E
33-E	34-E	3.4	204.6	+ 001	+ 344	1116.702	34-E
34-E	35-E	3.8	208.4	+ 019	+ 363	1122.720	35-E
35-E	36-E	3.1	211.5	- 016	+ 347	1114.275	36-E
36-E	37-E	3.6	215.1	- 007	+ 340	1151.003	37-E
37-E	38-E	3.8	218.9	- 013	+ 327	1110.606	38-E
38-E	39-E	4.5	223.4	+ 035	+ 362	1166.188	39-E
39-E	40-E	3.2	226.6	+ 018	+ 380	1181.375	40-E
40-E	41-E	3.8	230.4	- 023	+ 357	1188.809	41-E
41-E	42-E	1.9	232.3	+ 001	+ 358	1199.848	42-E
42-E	43-E	2.4	234.7	+ 014	+ 372	1196.091	43-E
43-E	44-E	3.5	238.2	+ 009	+ 381	1189.923	44-E
44-E	45-E	3.7	241.9	- 011	+ 370	1181.719	45-E
45-E	46-E	3.6	245.5	+ 018	+ 388	1213.359	46-E
46-E	47-E	3.1	248.6	- 033	+ 355	1196.672	47-E
47-E	48-E	3.0	251.6	+ 012	+ 367	1181.532	48-E
48-E	49-E	4.4	256.0	- 001	+ 366	1269.916	49-E
49-E	50-E	4.1	260.1	+ 008	+ 374	1261.393	50-E
50-E	51-E	2.9	263.0	+ 011	+ 385	1260.781	51-E
51-E	52-E	3.6	266.6	- 032	+ 417	1269.376	52-E
52-E	53-E	4.2	270.8	+ 026	+ 443	1275.226	53-E
53-E	54-E	5.0	275.8	+ 001	+ 444	1276.893	54-E
54-E	55-E	3.0	278.8	- 008	+ 436	1272.733	55-E
55-E	56-E	4.0	282.8	- 009	+ 427	1322.563	56-E
56-E	57-E	3.0	285.8	- 010	+ 417	1355.712	57-E
57-E	58-E	4.0	289.8	- 023	+ 394	1385.754	58-E
58-E	59-E	5.0	294.8	+ 038	+ 432	1411.827	59-E
59-E	60-E	4.0	298.8	- 004	+ 428	1451.269	60-E
60-E	61-E	2.9	301.7	- 012	+ 416	1482.971	61-E
61-E	62-E	4.0	305.7	+ 008	+ 424	1458.593	62-E
62-E	63-E	4.0	309.7	- 007	+ 417	1455.614	63-E
63-E	64-E	5.0	314.7	+ 024	+ 441	1497.104	64-E
64-E	65-E	4.1	318.8	+ 009	+ 450	1499.707	65-E
65-E	66-E	3.9	322.7	+ 015	+ 465	1532.170	66-E
66-E	67-E	4.0	326.7	- 009	+ 450	1560.481	67-E
67-E	68-E	4.0	330.7	+ 024	+ 480	1550.337	68-E
68-E	69-E	3.2	333.9	+ 009	+ 489	1545.550	69-E
69-E	70-E	3.8	337.7	+ 016	+ 505	1520.365	70-E
70-E	71-E	4.3	342.0	- 007	+ 498	1507.594	71-E

RESULTS OF PR. TISE LEVELLING  
FORT FRANCES TO FORT ARTHUR, ONT. *Continued*

BENCH-MARK		Distance between successive bench- marks.	Distance from bench- mark 3-C	DISCREPANCY		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No	No	Miles.	Miles	Feet	Feet	Feet	No
71-E	72-E	2.7	344.7	.010	+ 488	1533.529	72-E
72-E	73-E	3.0	347.7	.016	+ 504	1486.217	73-E
73-E	74-E	4.4	352.1	.016	+ 520	1503.553	74-E
74-E	75-E	7.6	359.7	.016	+ 474	1487.777	75-E
75-E	76-E	4.2	363.9	.020	+ 495	1443.867	76-E
76-E	77-E	2.8	366.7	.018	+ 511	1327.064	77-E
77-E	78-E	5.0	371.7	.032	+ 480	1214.844	78-E
78-E	79-E	3.9	375.6	.005	+ 475	1208.799	79-E
79-E	80-E	4.0	379.6	.002	+ 473	1156.238	80-E
80-E	81-E	3.7	383.3	.015	+ 488	1092.149	81-E
81-E	82-E	4.0	387.3	.030	+ 458	1062.547	82-E
82-E	83-E	3.3	390.6	.025	+ 435	1003.434	83-E
83-E	84-E	3.9	394.5	.016	+ 449	973.398	84-E
84-E	85-E	3.6	398.1	.007	+ 456	917.377	85-E
85-E	86-E	5.3	403.4	.015	+ 471	731.235	86-E
86-E	87-E	5.8	409.2	.019	+ 490	728.529	87-E
87-E	88-E	2.8	412.0	.007	+ 497	747.035	88-E
88-E	89-E	5.2	417.2	.002	+ 499	631.033	89-E
89-E	90-E	2.7	419.9	.013	+ 512	614.798	90-E
90-E	91-E	0.2	420.1	.001	+ 513	617.517	91-E
91-E	92-E	0.3	420.4	.000	+ 513	618.626	92-E
92-E	93-E	1.3	424.7	.006	+ 519	617.119	93-E
93-E	94-E	0.4	424.8	.004	+ 515	635.155	94-E
94-E	95-E	0.2	425.0	.002	+ 513	657.107	95-E

For connection at Port Arthur with Hydrographic Survey bench-mark, see Introduction.

RESULTS OF PRECISE LEVELLING.  
STANLEY TO NORTH LAKE, ONT

BENCH-MARK		Distance between successive bench marks.	Distance from bench mark 86 E.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles.	Feet	Feet	Feet.	No.
	86 E					731.235	86 E
86 E	96 E	5.4	5.4	+ .028	+ .028	770.873	96 E
96 E	97 E	4.0	9.4	- .022	+ .006	850.877	97 E
97 E	98 E	4.2	13.6	+ .017	+ .023	908.718	98 E
98 E	99 E	7.0	20.6	+ .035	+ .058	1277.534	99 E
99 E	100 E	3.9	24.5	- .023	+ .035	1363.512	100 E
100 E	101 E	4.3	28.8	- .024	+ .011	1438.281	101 E
101 E	102 E	4.5	33.3	+ .018	+ .029	1548.980	102 E
102 E	103 E	7.0	40.3	- .007	+ .022	1589.457	103 E
103 E	104 E	5.8	46.1	- .004	+ .018	1656.512	104 E
104 E	105 E	3.1	49.2	- .007	+ .011	1614.552	105 E
105 E	106 E	2.2	51.4	- .001	+ .010	1565.723	106 E

RESULTS OF PRECISE LEVELLING  
WAINWRIGHT TO EDMONTON, ALTA

BENCH-MARK.		Distance between successive bench- marks	Distance from bench- mark 28-D.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial	Total		
No.	No.	Miles	Miles.	Feet	Feet	Feet.	No.
	36 H		200.3		+ .031	2236.888	36 H
36 H	37 H	9.8	210.1	+ .021	+ .052	2067.822	37 H
37 H	38 H	6.1	216.2	+ .012	+ .064	2498.247	38 H
38 H	39 H	2.6	218.8	+ .008	+ .072	2241.135	39 H
39 H	40 H	6.5	225.3	- .025	+ .047	2337.185	40 H
40 H	41 H	9.0	234.3	- .012	+ .035	2401.741	41 H
41 H	42 H	3.8	238.1	- .017	+ .018	2297.138	42 H
42 H	43 H	7.8	245.9	+ .034	+ .049	2269.168	43 H

RESULTS OF PRECISE LEVELLING  
WAINWRIGHT TO EDMONTON, ALTA. *Continued*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 28-D.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial.	Total.		
No.	No.	Miles	Miles	Feet.	Feet.	Feet.	No.
43-H	44-H	6.3	252.2	-007	+012	2251.857	44-H
44-H	45-H	6.7	258.9	-013	+029	2239.803	45-H
45-H	46-H	9.2	268.1	+051	+080	2264.143	46-H
46-H	47-H	8.7	276.8	+021	+101	2268.646	47-H
47-H	48-H	1.5	278.3	-001	+100	2272.577	48-H
48-H	49-H	4.6	282.9	+033	+133	2262.044	49-H
49-H	50-H*	6.2	289.1	-028	+105	2293.944	50-H*
50-H*	51-H	0.3	289.4	-006	+049	2298.970	51-H
50-H*	52-H	6.9	296.0	+004	+109	2426.193	52-H
52-H	53-H	6.8	302.8	+003	+113	2432.680	53-H
53-H	54-H	5.2	308.0	+012	+125	2426.102	54-H
54-H	55-H	5.0	313.0	+012	+137	2336.510	55-H
55-H	56-H	6.4	319.4	+010	+147	2211.191	56-H
56-H	57-H	3.8	322.9	-001	+146	2129.988	57-H
57-H	58-H	6.6	329.5	-010	+136	2188.704	58-H
58-H	59-H		329.5	+005	+141	2188.052	59-H
58-H	60-H	1.8	331.3	+005	+141	2168.315	60-H
60-H	61-H	0.1	331.4	+003	+144	2163.805	61-H

\*See also elevation of this benchmark on page 187.

Connections at Edmonton with bench-marks of Topographical Survey, Branch, Dept. of the Interior:

B.M. H. 51, High Level Bridge, Elev. 2172.126

B.M. L. 1, Queens Ave. school, Elev. 2187.245

\* City of Edmonton B.M. 127, Elev. 2194.232

## RESULTS OF PRECISE LEVELLING.

## CALGARY TO TOFIELD, ALTA

BENCH-MARK.		Distance between successive bench marks.	Distance from bench mark 51 D.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK
From	To			Partial	Total		
No.	No. 51 D	Miles	Miles	Feet	Feet	Feet	No. 51 D
51 D	39 F	0.8	0.8	+006	+006	3428.199	51 D
39 F	40 F	2.9	3.7	+008	+014	3401.111	40 F
40 F	41 F	4.3	8.0	-021	-007	3473.085	41 F
41 F	42 F	7.9	15.9	-010	-017	3456.220	42 F
42 F	43 F	4.8	20.7	+033	+016	3309.688	43 F
43 F	44 F	4.1	24.8	-001	+015	3199.262	44 F
44 F	45 F	2.9	27.7	+018	+033	3115.246	45 F
45 F	46 F	3.0	30.7	+004	+037	3007.058	46 F
46 F	47 F	5.4	36.1	+002	+039	3034.393	47 F
47 F	48 F	2.8	38.9	-010	+029	2998.018	48 F
48 F	49 F	7.9	46.8	+033	+062	2943.801	49 F
49 F	50 F	4.4	51.2	-021	+041	2793.479	50 F
50 F	51 F	6.2	57.4	+034	+075	2953.784	51 F
51 F	52 F	7.4	64.8	-042	+033	2787.882	52 F
52 F	53 F	5.4	70.2	+010	+043	2934.911	53 F
53 F	54 F	3.5	73.7	+011	+054	2983.595	54 F
54 F	55 F	6.2	79.9	+006	+060	2863.894	55 F
55 F	56 F	9.1	89.0	-034	+026	2926.378	56 F
56 F	57 F	7.8	96.8	-000	+026	2930.439	57 F
57 F	58 F	6.0	102.8	+013	+039	2967.282	58 F
58 F	59 F	6.6	109.4	+022	+061	2835.519	59 F
59 F	60 F	7.3	116.7	-000	+061	2685.640	60 F
60 F	61 F	7.1	123.8	-013	+048	2622.316	61 F
61 F	62 F	1.4	124.9	+022	+070	2609.622	62 F
62 F	63 F	5.6	130.5	-001	+069	2603.558	63 F
63 F	64 F	6.1	136.6	+023	+092	2634.226	64 F
64 F	65 F	4.8	141.4	-021	+071	2602.346	65 F
65 F	66 F	8.5	149.9	-042	+029	2539.015	66 F
66 F	67 F	5.1	155.0	-000	+029	2471.679	67 F
67 F	68 F	7.7	162.7	+010	+039	2458.180	68 F
68 F	69 F	5.2	167.9	+009	+048	2381.363	69 F
69 F	70 F	8.1	176.0	-049	+009	2431.551	70 F
70 F	71 F	0.4	176.4	-000	+009	2428.335	71 F
71 F	72 F	2.2	178.2	+009	+018	2415.191	72 F
72 F	73 F	4.5	182.7	+013	+031	2446.688	73 F
73 F	74 F	6.1	188.8	-025	+006	2454.387	74 F
74 F	75 F	6.0	194.8	+020	+026	2385.849	75 F
75 F	76 F	5.2	200.0	-005	+021	2341.341	76 F
76 F	50 H*	1.8	201.8	+021	+042	2295.229	50 H*

\*See also elevation of this bench-mark on page 186

## RESULTS OF PRECISE LEVELLING.

CALGARY, ALTA., TO FIELD, B.C.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 51 D.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial.	Total.		
No	No	Miles	Miles	Feet.	Feet.	Feet.	No
	51 D					3428.199	51-D
51 D	217 C	0.4	0.4	- 004	- 004	3441.339	217 C
217 C	218 C	0.8	1.2	+ 012	+ 008	3449.278	218 C
218 C	219 C	7.0	8.2	+ 010	+ 018	3515.755	219 C
219 C	220 C	4.6	12.8	- 001	+ 017	3598.733	220 C
220 C	221 C	3.2	16.0	- 002	+ 015	3626.029	221 C
221 C	222 C	7.2	23.2	+ 005	+ 020	3771.003	222 C
222 C	223 C	0.8	24.0	- 006	+ 014	3748.375	223 C
223 C	224 C	2.1	26.1	+ 010	+ 024	3727.944	224 C
224 C	225 C	6.5	32.6	+ 027	+ 051	3858.645	225 C
225 C	226 C	7.4	40.0	+ 008	+ 059	4063	226 C
226 C	227 C	3.5	43.3	- 010	+ 049	4077.008	227 C
227 C	228 C	7.0	50.3	+ 019	+ 068	4222.877	228 C
228 C	229 C	1.9	52.2	- 019	+ 049	4213.117	229 C
229 C	230 C	1.3	53.5	+ 003	+ 052	4208.011	230 C
230 C	231 C	3.8	57.3	- 013	+ 039	4251.423	231 C
231 C	232 C	3.5	60.8	+ 006	+ 045	4237.092	232 C
232 C	233 C	1.1	61.9	+ 007	+ 052	4237.527	233 C
233 C	234 C	4.0	65.9	+ 014	+ 066	4293.308	234 C
234 C	235 C	1.3	67.2	- 016	+ 050	4294.339	235 C
235 C	236 C	2.7	69.9	+ 005	+ 055	4339.829	236 C
236 C	237 C	4.5	74.4	+ 002	+ 057	4372.297	237 C
237 C	238 C	3.2	76.6	+ 012	+ 069	4454.270	238 C
238 C	239 C	2.2	78.8	- 020	+ 049	4543.565	239 C
239 C	240 C	4.8	82.6	+ 016	+ 065	4531.828	240 C
240 C	241 C	0.6	83.2	+ 001	+ 066	4541.405	241 C
241 C	242 C	6.9	89.5	+ 032	+ 097	4564.110	242 C
242 C	243 C	7.3	96.8	- 004	+ 093	4649.933	243 C
243 C	244 C	4.6	100.4	- 003	+ 090	4688.465	244 C
244 C	245 C	6.1	106.5	+ 017	+ 107	4820.308	245 C

## RESULTS OF PRECISE LEVELLING

CALGARY, ALTA., TO FIELD, B.C.—Continued.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 51-D.	DISCREPANCY.		Elevation above mean sea level	BENCH-MARK
From	To			Partial.	Total.		
No.	No.	Miles	Miles	Feet	Feet	Feet	No.
245 C	246 C	2.3	108.8	-0.009	+0.098	4874.895	246 C
246 C	247 C	5.1	113.9	+0.007	+0.105	4967.729	247 C
247 C	248 C	2.6	116.5	+0.017	+0.122	5045.816	248 C
248 C	249 C	0.5	117.0	+0.007	+0.129	5055.168	249 C
249 C	250 C	1.3	118.3	-0.006	+0.123	5078.239	250 C
250 C	251 C	3.4	121.7	+0.005	+0.128	5282.892	251 C
251 C	252 C	1.0	122.7	+0.005	+0.133	5344.598	252 C
252 C	253 C	2.8	125.5	+0.005	+0.138	5218.159	253 C
253 C	254 C	1.0	126.5	+0.005	+0.143	5178.526	254 C
254 C	255 C	3.5	130.0	+0.001	+0.144	4802.650	255 C
255 C	256 C	1.2	131.2	-0.002	+0.142	4675.667	256 C
256 C	257 C	1.1	132.3	-0.010	+0.132	4563.936	257 C
257 C	258 C	1.4	133.7	-0.006	+0.126	4413.235	258 C
258 C	259 C	2.1	135.8	-0.018	+0.108	4187.002	259 C
259 C	260 C	1.4	137.2	-0.011	+0.097	4074.638	260 C

Connections with bench-marks of Irrigation Branch, Dept. of the Interior:—

On C.P.R. bridge over Bow river, mileage 53.1 west of Calgary, Elev. 4205.153.

On S.W.  $\frac{1}{4}$  sec. 2, tp. 26, rge. 12, W. 5th mer. (near Banff station), Elev. 4530.501.On S.W.  $\frac{1}{4}$  sec. 27, tp. 28, rge. 16, W. 5th mer. (mileage 116 west of Calgary), Elev. 5034.850.



## RESULTS OF PRECISE LEVELLING.

VANCOUVER, B.C., TO BLAINE, WASH.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 1-J.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
1 J	1-J			- .002	- .002	43.446	1-J
2 J	2-J					53.684	2-J
	3 J	0.8	0.8	+ .002	.000	38.390	3-J
3 J	4-J	0.2	1.0	+ .010	+ .010	49.242	4-J
3-J	5-J	2.6	3.4	+ .006	+ .006	58.012	5-J
5 J	6 J	3.2	6.6	- .006	.000	53.925	6-J
6 J	7 J	0.1	6.7	+ .005	+ .005	48.771	7-J
7 J	8 J	5.5	12.2	+ .039	+ .044	38.503	8-J
8 J	9 J	2.5	14.7	- .002	+ .042	40.157	9-J
9 J	10 J	0.6	15.3	+ .012	+ .054	43.293	10-J
10 J	11 J		15.3	+ .001	+ .055	44.110	11-J
11 J	12 J		15.3	+ .001	+ .056	57.703	12-J
11 J	13 J	0.4	15.7	+ .001	+ .056	13.383	13-J
9 J	14 J	4.8	19.5	- .002	+ .040	23.046	14-J
14-J	15-J	2.8	22.3	- .007	+ .033	26.734	15-J
15-J	16-J	7.8	30.1	+ .017	+ .050	10.561	16-J
16 J	17 J	4.2	34.3	+ .006	+ .056	11.136	17-J
17 J	18 J	0.4	34.7	+ .003	+ .059	7.877	18-J
18 J	19 J	2.4	37.1	+ .007	+ .066	18.119	19-J

RESULTS OF PRECISE LEVELLING.  
 COLEBROOK TO HUNTINGDON, B.C.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 15-J.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
15-J	15-J					26.734	15-J
	20-J	9.6	9.6	+ .036	+ .036	14.195	20-J
20-J	21-J		9.6	+ .004	+ .040	7.336	21-J
20-J	22-J	7.9	17.5	+ .022	+ .058	183.866	22-J
22-J	23-J	0.6	18.1	+ .001	+ .059	163.805	23-J
23-J	24-J	7.6	25.7	+ .021	+ .080	336.591	24-J
24-J	25-J	8.6	34.3	+ .036	+ .116	172.075	25-J
25-J	26-J	4.4	38.7	- .013	+ .103	72.863	26-J
26-J	27-J	1.0	39.7	+ .009	+ .112	32.356	27-J

TABLE III.

## RAIL ELEVATIONS, HALIFAX, N.S., TO MONCTON, N.B.

(Elevations taken in 1914 and 1915).

	FEET
Intercolonial Railway—Halifax	59.9
" Richmond	20.0
" Southwestern Junction	28.0
" Fairview	13.1
" Rockingham	10.0
" Birch Cove	18.7
" Prince Lodge	15.3
" Mill View	11.0
" Bedford	43.1
" Sackville river; rail	45.4
" Rocky lake; water, Aug. 10, 1914	128.7
" Rocky Lake (station)	134.3
" Lakeview	137.1
" Windsor Junction	129.0
Dominion Atlantic Ry.—Windsor Junction	234.3
" Beaverbank	244.8
" Horseshoe lake; water, Aug. 17, 1914	457.9
" South Uniake	521.7
" Mount Uniake	497.5
" Uniake lake; water, Aug. 21, 1914	248.3
" Ellershouse	182.7
" Hartville	178.1
" St. Croix river; water, Aug. 26, 1914, 117.9; rail	111.3
" Newport	82.2
" Threemile Plains	28.3
" Windsor	34.1
" Brooklyn	135.1
" Scotch Village	38.1
" Mosherville	41.2
" Stanley	70.7
" Clarksville	98.2
" Kennetcook	99.1
" Kennetcook river; water, Sept. 14, 1914, 81.3; rail	116.3
" Patterson	139.3
" Doddridge	140.8
" Burton	31.4
" South Maitland	85.3
" Greenoaks	212.0
" Princeport Road	32.1
" Clifton	34.8
" McNutt Creek	33.0
" Lower Truro	61.8
Intercolonial Railway—Truro	51.9
" Salmon river; water, Sept. 28, 1914, 35.1; rail	40.4
" North river; water, Sept. 28, 1914, 26.8; rail	48.3
" Onslow	83.7
" Chiganois river; water, Sept. 30, 1914, 64.1; rail	85.3
" Belmont	156.5
" Debert river; water, Oct. 2, 1914, 134.2; rail	155.2

RAIL ELEVATIONS, HALIFAX, N.S., TO MONCTON, N.B.—*Continued.*

(Elevations taken in 1914 and 1915).

	FEET
Intercolonial Railway—East Mines	196.3
" Folly river; water, Oct. 3, 1914, 110.0; rail.	194.3
" Londonderry	335.9
" Probert	429.9
" Folly lake; water, Oct. 6, 1914.	600.6
" Folleigh	612.5
" Wentworth	470.4
" Westchester	311.6
" Greenville	284.3
" Atkinson	246.6
" Thompson	106.6
" Oxford Junction (main line)	92.6
" River Philip; water, Oct. 19, 1914, 41.5; rail.	93.3
" River Philip (station)	169.9
" Salt Springs	151.2
" Springhill Junction	199.3
" Little Forks river; water, Oct. 29, 1914, 38.2; rail.	72.0
" Athol	134.2
" Maccan	31.7
" Nappan	28.7
" Amherst	59.9
" Fort Lawrence	33.9
" Aulac	24.4
" Sackville	24.9
" Evans	200.1
" Dorchester	21.5
" Upper Dorchester	25.5
" College Bridge	28.6
" Memramcook	26.6
" Gayton Crossing	46.5
" Calhoun	50.5
" Meadow Brook	82.7
" Painses	149.4
" Cook	134.1
" Harrisville	126.3
" Buetouche Junction	68.6
" Humphrey	57.5
" Sunny Brae	42.8
" Moncton	50.4

## RAIL ELEVATIONS, BRIDGEWATER TO WINDSOR, N.S.

(Elevations taken in 1914).

	FEET
Halifax & Southwestern Ry.—Bridgewater	10.9
" Mossman	134.9
" Northfield	130.5
" North brook; water, June 11, 1914, 113.4; rail.	126.6
" Riversdale	122.6
" New Germany Junction	237.1
" New Germany	258.3
" Lahave river; water, June 12, 1914, 201.0; rail.	214.7
" Cherryfield	344.0
" Hastings Junction	543.6
" Springfield	548.9

RAIL ELEVATIONS, BRIDGEWATER TO WINDSOR, N.S.—*Continued.*

(Elevations taken in 1914).

	FEET
Halifax & Southwestern Ry.—Freeman lake; water, June 19, 1914	543.1
" Ridgeroad	574.1
" Dalhousie	610.3
" Waterloo river; water, June 26, 1914, 568.8; rail	580.0
" Squirreltown	615.7
" Albany	571.2
" Alpena river; water, June 27, 1914, 528.3; rail	535.6
" Alpena	53.3
" Nictaux	150.1
" Annapolis river; water, July 6, 1914, 26.0; rail	50.2
" Dominion Atlantic railway (diamond crossing)	70.5
Dominion Atlantic Railway—Middleton	70.1
" Wilmot	69.5
" Kingston	85.9
" Auburn	94.9
" Aylesford	100.3
" Berwick	138.1
" Waterville	93.5
" Cambridge	65.4
" Coldbrook	68.4
" Kentville	35.0
" Port Williams	31.3
" Wolfville	27.0
" Grand Pré	27.8
" Horton Landing	42.1
" Avonport	35.0
" Hantsport	50.1
" Mount Denison	50.2
" Falmouth	30.5
" Windsor	28.3

## RAIL ELEVATIONS, ST. LEONARD TO CAMPBELLTON, N.B.

(Elevations taken in 1914).

	FEET
Canadian Pacific Ry.—St. Leonard (taken in 1909)	509.4
Intercolonial Railway—Jardine Brook	878.3
" Nickel	907.1
" Hazen	930.5
" Anderson	914.3
" Kedgwick	896.6
" Upsalquitch	133.6
" Upsalquitch river; water, Aug. 7, 1914, 115.4; rail	134.1
" Campbellton	42.4

## RAIL ELEVATIONS, MCGIVNEY JUNCTION TO CHATHAM, N.B.

(Elevations taken in 1914 and 1915).

	FEET
Intercolonial Railway—National Transcontinental railway (diamond crossing at McGivney Jet.)	571.6
" Clearwater	503.5
" Astle	517.4
" Boiestown	235.7
" Ludlow	178.8
" McNamee	143.9
" Carroll	166.1
" Doaktown	121.0

## RAIL ELEVATIONS, MCGIVNEY JUNCTION TO CHATHAM, N.B.—Continued.

(Elevations taken in 1914 and 1915).

	FEET
Intercolonial Railway—Southwest Miramichi river; water, Oct. 21, 1914, 93.4; rail	115.0
" Blissfield	250.6
" Hurley Brook	332.9
" Weaver	345.3
" Upper Blackville	233.5
" Forks	182.6
" Keenan	70.0
" Blackville	89.6
" Bartholomew river; water, June 2, 1915, 33.1; rail	55.7
" McLaggan	67.6
" Underhill	58.0
" Barnett	142.6
" McCann	166.5
" Renous river; water, June 3, 1915, 8.8; rail	69.8
" Renous	70.7
" Quarryville	33.1
" Davidson	84.7
" Park	93.6
" Bryenton	102.6
" Parker	55.3
" Millerton	25.6
" Amos	15.8
" Derby Junction (Fredericton branch)	35.8
" Nelson Junction (main line)	37.1
" Nelson	50.8
" Harper	78.8
" Chatham	9.1

## RAIL ELEVATIONS, ST. ANSELME TO LEVIS, QUE.

(Elevations taken in 1911).

	FEET
National Transcontinental Ry.—St. Anselme	566.7
" St. Isidore	446.8
" Intercolonial railway "cut-off" (diamond crossing at Diamond Junction)	209.4
Intercolonial Railway—St. Romuald	71.9
" Hadlow	20.1
" Pointe Levis	16.6
" Levis	16.6

## RAIL ELEVATIONS, COOKSHIRE, QUE., TO BEECHER FALLS, VERMONT.

(Elevations taken in 1915).

	FEET
Maine Central Railroad—Cookshire	681.7
" Eaton Corner	506.9
" Sawyerville	884.3
" Clifton	1144.2
" St. Isidore	1245.0
" Camp Three	1343.5
" Camp Four	1391.6
" St. Malo	1505.5
" Malvina	1437.5
" Hall stream; water, July 2, 1915, 1346.1; rail	1359.4
" Paquette	1237.3
" East Hereford	1115.0
" Comin Mills	1085.0
" International boundary	1091.3

## RAIL ELEVATIONS, SUDBURY TO SAULT STE. MARIE, ONT.

(Elevations taken in 1914 and 1915)

	FEET
Canadian Pacific Ry.—Sudbury.	856.6
" Copper Cliff.	859.8
" Naughton....	805.1
" Vermilion river; water, Sept. 11, 1914, 767.8; rail	793.0
" Whitefish	809.9
" Victoria Mine.	826.7
" Worthington	775.2
" Turbine	709.7
" Nairn	721.1
" Algoma Eastern railway (under crossing) rail, 693.6; C.P.R. rail	725.9
" Spanish river; water, Aug. 11, 1915, 646.5; rail	676.0
" Espanola	686.8
" Webbwood.	664.8
" Birch brook; water, Sept. 28, 1914, 589.7; rail	647.2
" River aux Sables; water, Oct. 5, 1914, 580.2; rail.	640.2
" Massey	638.8
" Walford.	672.5
" Spanish....	609.9
" Cutler.	612.3
" Kennabutch.	644.1
" Serpent river; water, Oct. 16, 1914, 579.3; rail	602.4
" Spragge.	600.8
" Lauzon river; water, Oct. 24, 1914, 582.4; rail	605.1
" Algoma	604.3
" Blind River (station)	601.1
" Blind river; immediately west of Blind River station; water, Oct. 27, 1914, 590.9; rail.	601.4
" Blind river; 2 miles west of Blind River station; water, Oct. 29, 1914, 590.9; rail	596.0
" Missisagi river; water, Oct. 29, 1914, 579.0; rail.	605.8
" Dean Lake.	627.4
" Dayton	604.0
" Livingston.	645.2
" Thessalon.	656.6
" Sherwood.	597.7
" Nestorville.	620.5
" Glen Otter	646.5
" Bruce	680.3
" Lake Huron and Northern Ontario railway (diamond crossing)	680.6
" Portlock.	593.6
" Desbarats....	595.3
" Isbester	600.5
" Bar River (station)	596.0
" Bar river; water, May 25, 1915, 580.5; rail.	596.0
" Ekoba	591.3
" Echo bay; water, May 26, 1915, 579.1; rail (on bridge)	597.8
" Garden river; water, May 27, 1915, 580.5; rail.	607.3
" Garden.	607.2
" Root river; water, June 9, 1915, 580.4; rail	609.5
" Kabosa.	622.4
" Sault Ste. Marie, Ont	635.9
" Algoma Central railway (under crossing) rail, 594.8; C.P.R. rail....	618.0
" Canadian ship canal; water, June 12, 1915, 600.4; rail (swing bridge).	620.9

## RAIL ELEVATIONS, FORT FRANCES TO PORT ARTHUR, ONT.

(Elevations taken in 1913).

	FEET
Canadian Northern Ry.—Fort Frances	1122.3
" Duluth Junction	1123.1
" Rainy lake; water, Sept. 9, 1913	1108.2
" Rocky Inlet	1136.3
" Sims	1113.6
" Nickel Lake	1119.0
" Bear Pass	1153.5
" Mine Centre	1200.7
" Seine river, 2.4 miles west of La Seine; rail	1179.4
" La Seine	1180.1
" Banning	1264.0
" Elizabeth	1282.6
" Overflow...	1280.1
" Atikokan	1285.2
" Atikokan river, 2 miles east of Atikokan; water, Oct. 15, 1913, 1302.8; rail	1316.0
" Atikokan river, 2.5 miles east of Atikokan; water, Oct. 15, 1913, 1310.5; rail	1342.4
" Atikokan river, 3.4 miles east of Atikokan; water, Oct. 15, 1913, 1345.9; rail	1355.6
" Atikokan river, 3 miles west of Hematite; water, Oct. 14, 1913, 1356.4; rail	1368.2
" Hematite	1368.1
" Atikokan river, 1.2 miles east of Hematite; water, Oct. 9, 1913, 1359.6; rail	1370.0
" Atikokan river, 2 m <sup>1</sup> east of Hematite; rail	1374.5
" Kawene	1483.1
" Abiwin	1439.9
" Windigo	1480.4
" Huronian	1570.8
" Crayfish creek, 3 miles west of Kashabowi; water, Sept. 19, 1913, 1512.4; rail	1520.6
" Kashabowi	1531.2
" Kashabowi river; water, Sept. 18, 1913, 1501.3; rail	1516.8
" Rossmere	1481.8
" Swamp river, 1.8 miles east of Rossmere; rail	1486.1
" Annex...	1474.7
" Mabella...	1442.4
" Shebandowan river; water, Sept. 16, 1913, 1260.7; rail	1295.5
" Shabakwa..	1242.4
" Mattawin river, 6 miles west of Mattawin; water, Sept. 5, 1913, 1200.8; rail	1218.0
" Mattawin	1202.0
" Mokomon..	1063.7
" Kakabeka Falls...	915.4
" Stanley	720.6
" Slate River..	727.4
" Twin City Junction	723.3
" National Transcontinental railway (diamond crossing)	635.8
" Canadian Pacific railway (diamond crossing)	635.8
" Westfort	620.8
" Fort William	612.8
Canadian Pacific Ry.—Fort William	617.4
Canadian Northern Ry.—Canadian Pacific railway (diamond crossing)	607.2
" Port Arthur	615.0
Canadian Pacific Ry.—Port Arthur	614.5



## RAIL ELEVATIONS, STANLEY TO NORTH LAKE, ONT.

(Elevations taken in 1913)

	FEET
Canadian Northern Ry.—Stanley	720.6
" Flint	780.0
" Silver Creek	808.6
" Hymer	860.2
" Nola	1055.5
" Hillside	1096.8
" Silver Mountain	1278.8
" Whitefish	1340.4
" North Lake	1567.5

## RAIL ELEVATIONS, WAINWRIGHT TO EDMONTON, ALTA.

(Elevations taken in 1914).

	FEET
Grand Trunk Pacific Ry.—Wainwright	2222.1
" Fabyan	2138.8
" Hawkins	2132.5
" Irma	2244.8
" Jarrow	2347.0
" Kinsella	2297.4
" Philips	2297.7
" Viking	2267.0
" Nestor	2253.9
" Bruce	2240.5
" Holden	2253.7
" Poe	2247.3
" Ryley	2273.1
" Canadian Northern railway, Vegreville-Calgary line (diamond crossing)	2274.8
" Shotts	235.5
" Tofield	2294.8
" Deville	2444.2
" Cooking Lake	2433.7
" Uncas	2459.3
" Ardrossan	2336.9
" Bremner	2249.3
" Clover Bar	2155.1
" North Saskatchewan river; water, Oct. 14, 1914, 2000; rail	2136.7
Canadian Northern Ry.—Edmonton	2185.4
Canadian Pacific Ry.—Edmonton	2182.9

## RAIL ELEVATIONS, CALGARY TO TOFIELD, ALTA

(Elevations taken in 1915)

	FEET
Grand Trunk Pacific Ry.—Calgary (temporary station)	3418.1
" Elbow river; water, April 29, 1915, 3404.2; rail	3420.5
" Canadian Pacific railway, Calgary-Edmonton line (diamond crossing)	3408.6
" Bow river; water, April 29, 1915, 3365.8; rail	3404.5
" Hubsita	3471.8
" Conrich	3486.1
" Delacour	3508.3
" Kuthvyn	3212.2
" Irricana	3061.0

RAIL ELEVATIONS, CALGARY TO TOFIELD, ALTA.—*Continued*

(Elevations taken in 1915.)

	FEET
Grand Trunk Pacific Ry.—Rosebud river; water, May 20, 1915, 2996.1; rail.....	3018.1
“ Canadian Pacific railway, Acme branch (under crossing), rail 3013.0; G.T.P. Ry. rail .....	3037.1
“ Beiseker .....	2999.5
“ Bircham .....	2966.3
“ Grainger .....	2795.7
“ Swalwell .....	2951.1
“ Twining .....	2827.2
“ Three Hills .....	2935.7
“ Trochu .....	2859.8
“ Huxley .....	2878.5
“ El Nora .....	3039.5
“ Lousana .....	2938.6
“ Delburne .....	2837.7
“ Ardley .....	2758.0
“ Red Deer river; water, July 3, 1915, 2503. rail .....	2661.3
“ Bullocksville .....	2672.3
“ Canadian Northern railway, branch from Warden (overhead crossing) G.T.P. Ry. rail .....	2623.3
“ Alix .....	2615.1
“ Canadian Pacific railway, Lacombe-Coronation line (diamond crossing) .....	2610.2
“ Mirror .....	2605.8
“ Bashaw .....	2602.3
“ Dorence .....	2537.1
“ Ferintosh .....	2478.4
“ New Norway .....	2460.5
“ Duhamel .....	2432.5
“ Battle river; water (flood), July 28, 1915, 2261; rail .....	2376.0
“ Olm .....	2458.1
“ Camrose .....	2430.4
“ Canadian Pacific railway, Portage-la-Prairie-Wetaskiwin line (diamond crossing) .....	2431.6
“ Canadian Northern railway, Camrose-Strathcona line (diamond crossing) .....	2417.7
“ Dinart .....	2476.5
“ Kingman .....	2426.5
“ Busby .....	2405.3
“ Tofield .....	2296.1

## RAIL ELEVATIONS, CALGARY, ALTA., TO FIELD, B.C.

(Elevations taken in 1915.)

	FEET
Canadian Pacific Railway—Calgary .....	3439.4
“ Bruckburn .....	3487.2
“ Bow river (mileage 7.7 from Calgary); water, May 19, 1915, 3500.8; rail .....	3521.5
“ Bow river (mileage 7.8 from Calgary); water, May 19, 1915, 3501.7; rail .....	3523.8
“ Keith .....	3565.5
“ Bearsaw .....	3626.8
“ Glenbow .....	3688.5
“ Cochrane .....	3760.8
“ Bow river (mileage 2.7 from Calgary); water, May 11, 1915, 3761.7; rail .....	3728.1
“ Mitford .....	3735.4
“ Radnor .....	3897.3
“ Cheneka .....	4013.5
“ Morley .....	4069.0
“ Orada .....	4161.9

RAIL ELEVATIONS, CALGARY, ALTA., TO FIELD, B.C.—*Continued.*

Elevations taken in 1915.

	FEET
Canadian Pacific Railway.—Kananaskis river (mileage 51.9 from Calgary); water, May 29, 1915, 4194.8;	
rail.....	4218.0
"    Seebe.....	4219.1
"    Bow river (mileage 53.1 from Calgary); water, June 8, 1915, 4199.6; rail...	4214.8
"    Kananaskis.....	4232.8
"    Exshaw.....	4261.2
"    Gap.....	4248.7
"    Canmore.....	4206.9
"    Duthil.....	4362.1
"    Bow river (mileage 73.1 from Calgary); water, June 14, 1915, 4359.9; rail..	4374.9
"    Anthracite.....	4500.3
"    Devils Head creek (mileage 78.4 from Calgary); water, June 29, 1915, 4538.0;	
rail.....	4548.9
"    Bankhead.....	4584.3
"    Banff.....	4538.2
"    Echo river (mileage 82.1 from Calgary); water, June 22, 1915, 4524.3; rail..	4534.3
"    Sawback.....	4549.9
"    Massive.....	4592.8
"    Mount Castle.....	4676.4
"    Eldon.....	4829.2
"    Temple.....	4925.0
"    Lake Louise.....	5051.0
"    Bow river (mileage 117.6 from Calgary); water, July 20, 1915, 5004.1; rail...	5074.9
"    "The Great Divide" rail.....	5338.9
"    Stephen.....	5332.3
"    Hector.....	5220.0
"    Kicking Horse river (mileage 125.5 from Calgary); water, July 26, 1915,	
5201.6; rail.....	5212.0
"    Kicking Horse river (mileage 125.9 from Calgary); water, July 26, 1915,	
5173.0; rail.....	5179.9
"    Yoho.....	4725.0
"    Kicking Horse river (mileage 131.7 from Calgary); water, Aug. 2, 1915,	
4512.1; rail.....	4566.6
"    Cathedral.....	4501.8
"    Field.....	4076.1

## RAIL ELEVATIONS, VANCOUVER, B.C., TO BLAINE, WASH.

Elevations taken in 1914.

	FEET
Canadian Pacific Railway—Vancouver	17.5
Great Northern Railway—Vancouver	16.3
"    Still Creek	100.4
"    Arden	54.7
"    B. C. Electric railway—diamond crossing	53.9
"    Burnaby	54.6
"    B. C. Electric railway—diamond crossing	16.0
"    Sapperton	14.4
"    New Westminster	34.0
Canadian Pacific Railway—New Westminster	11.3
Great Northern Railway—Canadian Pacific railway—under crossing rail 11.6; G. N. R. rail	34.3
"    Fraser river bridge—rail	33.9
"    Traskwood	15.0
"    Caledbrook	8.1
"    Crescent	17.7
"    Ocean Park	17.6
"    White Rock	14.7

## RAIL ELEVATIONS, COLEBROOK TO HUNTINGDON, B.C.

(Elevations taken in 1914.)

	FEET
Great Northern Railway—Colebrook..	8-1
“ Alluvia .....	5-5
“ Cloverdale .....	6-4
“ Lincoln .....	183-2
“ Otter .....	304-0
“ Aldergrove .....	344-2
“ Pinegrove .....	267-2
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Great Northern Railway—Abbotsford ...	139-1
“ Junction with Kilgard branch .....	123-6
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Note.—Under "Year of Publication,"

1910 refers to Appendix No. 5 to the Chief Astronomer's Report for 1910.

1913\* refers to Vol. I, No. 2, on Precise Levelling.

1913 refers to Vol. I, No. 3, on Precise Levelling.

1914 refers to Vol. I, No. 8, on Precise Levelling.

1915 refers to Vol. II, No. 1, on Precise Levelling.

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Dean Lake, Ont.....	609	1916	156	182

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Denmark, N.S.	140-B	1913	46	74
Depot Harbour, Ont.	566, 567	1915	13	31
Derby Jet., N.B.	47 G-2	1916	152	178
Desbarats, Ont.	622	1916	157	182
Devlin, Ont.	27-E	1914	226	239
Dinant, Alta.	73 F	1916	165	187
Disley, Sask.	8 D	1913	74	90
Doaktown, N.B.	37 G	1916	151	178
Dobbinton, Ont.	294	1913	60	83
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Dorence, Alta.	66 F	1916	165	187
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Drinkwater, Sask.	91-C	1913	70	80
Drummondville Jet., Que.	51	1910	454	464
Duck Lake, Sask.	42 D	1914	228	240
Dundalk, Ont.	274	1913	59	82
Dundas, Ont.	215	1913	55	80
Dundurn, Sask.	25 D	1914	227	240
Dunmore, Alta.	165-C	1915	22	35
E.				
Eady, Ont.	398	1913	65	86
Eastman Jet., Que.	44	1910	452	463
East Pubnico, N.S.	453 B	1915	13	29
Eastwood, Ont.	225	1913	55	80
Echo Bay, Ont.	626	1916	157	182
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Ekoba, Ont.	626	1916	157	182
Elmwood, Ont.	297	1913	60	83
Elva, Man.	44-C	1913	68	88
Embrun, Ont.	498	1914	220	235
Emerson, Man.	3-C	1913	66	87
Emo, Ont.	23-F, 24-E	1914	226	239
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Ernestown, Ont.	146	1910	459	467
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" "	63, 64	1910	453	464
Ferintosh, Alta.	67-F	1916	165	187
Field, B.C.	260-C	1916	168	189
Finch, Ont.	105	1910	457	466
" "	495	1914	219	235
Findlater, Sask.	11-D	1913	72	90
Flesherton, Ont.	277	1913	59	82
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Foster, Que.	47	1910	452	463
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Fulford, Que.	56	1910	452	463
	G.			
Gainsborough, Sask.	47-C	1913	66	88
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Gracefield, Que.	184	1914	219	234
Graceton, Minn.	14-E	1914	226	239
Grafton, Ont.	168	1913	53	79
Granger, Alta.	50-F	1916	164	187
Grand Coulee, Sask.	101-C	1913	71	80
Grand Falls, N.B.	46-B	1910	448	461
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Green River, N.B.	54-B	1910	449	461
Green Valley, Ont.	97	1910	456	466
Greta, Man.	4-C	1913	66	87
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Gull Lake, Sask.	136-C	1914	230	241

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Ingersoll, Ont.	229, 230	1913	56	80
Inkerman, Ont.	110	1910	457	466
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Vancouver, B.C. ....	1-J to 5-J	1916	168	190
Vera, Sask. ....	23-H	1915	20	34
Versailles, Que. ....	72	1910	452	463
Viking, Alta. ....	43-H	1916	162	185
Vulcan, Alta. ....	68-D, 69-D	1915	26	38
	W			
Wainwright, Alta. ....	36-H	1915	21	34
Wakefield, Que. ....	469, 470	1914	218	234
Wallaceburg, Ont. ....	367	1914	222	236
Walah, Alta. ....	155-C	1915	22	
Warman, Sask. ....	35-D	1914	228	240
Warner, Alta. ....	209-C, 210-C	1915	24	36, 37
Warroad, Minn. ....	12-E	1914	226	239
Waterville, N.S. ....	480-B	1916	148	175
Waterville, Que. ....	9	1910	455	465
Webb, Sask. ....	132-C	1914	230	241
Webbwood, Ont. ....	585	1916	155	181
Weiland, Ont. ....	213	1913	64	85
Weiland Jct., Ont. ....	214	1913	64	85
Westchester, N.S. ....	CMLX	1916	†	172
Westfort, Ont. ....	80-E	1916	161	184
West Merigomish, N.S. ....	163-B	1913	47	74
Weston, Ont. ....	256-A	1913	58	82
Weyburn, Sask. ....	80-C, 81-C	1913	70	89
Whitby, Ont. ....	180-A	1913	54	79
Whitehorse, Y.T. ....	1	1913*	25	25
Whitemouth, Man. ....	14-F	1915	18	33
White Pass, Y.T. ....	42-R, 43-R	1913*	24	23
Whiterock, B.C. ....	17-J, 18-J	1916	169	190
Whitewater, Man. ....	35-C	1913	68	88
Whitney, Ont. ....	536	1915	15	31
Wilcox, Sask. ....	80-C, 87-C	1913	70	89
Wilmot, N.S. ....	485-B	1916	148	175
Winchester, Ont. ....	109	1910	157	406
Windsor, Ont. ....	255	1913	57	81
Windsor, N.S. ....	502-B to 505-B	1916	149	176
Windsor Jct., N.S. ....	MXXXIV	1916	†	171
Wingham, Ont. ....	314	1913	61	83

†Refer to Public Works Dept.

ALPHABETICAL LIST OF CITIES, TOWNS AND VILLAGES AT OR NEAR WHICH BENCH-MARKS  
HAVE BEEN ESTABLISHED.—*Concluded.*

Place.	B.M. Number.	Year of Publication.	Description.	Elevation.
			Page.	Page.
Winnifred, Alta.....	176-C	1915	23	35
Winnipeg, Man.....	1-F, 2-F, 3-F	1915	17	33
Winona, Ont.....	202	1913	63	85
Winter, Sask.....	25-H	1915	20	34
Wolfville, N.S.....	495-B to 497-B	1916	148, 149	175
Woodstock, Ont.....	226, 227	1913	55	80
Woodstock, N.B.....	25-B, 26-B, 27-B	1910	447	460
Worthington, Ont.....	577	1916	154	181
Wounded Moose, Y.T.....	179	1913*	33	33
	Y.			
Yarmouth, N.S.....	463-B, 464-B, 465-B	1915	13	30
Yellow Grass, Sask.....	83-C	1913	70	89
Yukon Crossing, Y.T.....	94	1913*	29	29
	Z			
Zumbro, Sask.....	27 H	1915	20	34

Dominion Observatory,

Ottawa,

February, 1916



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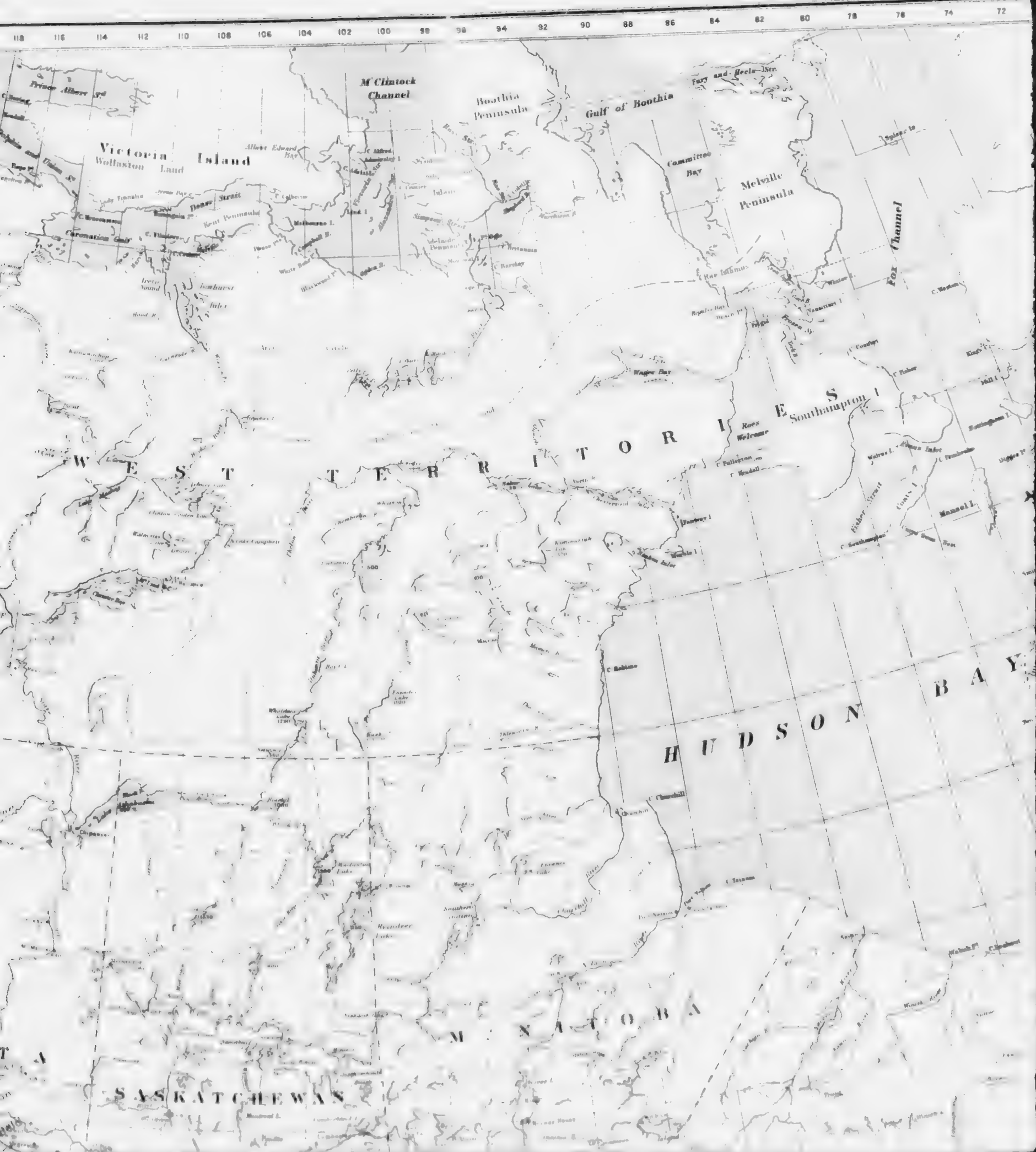
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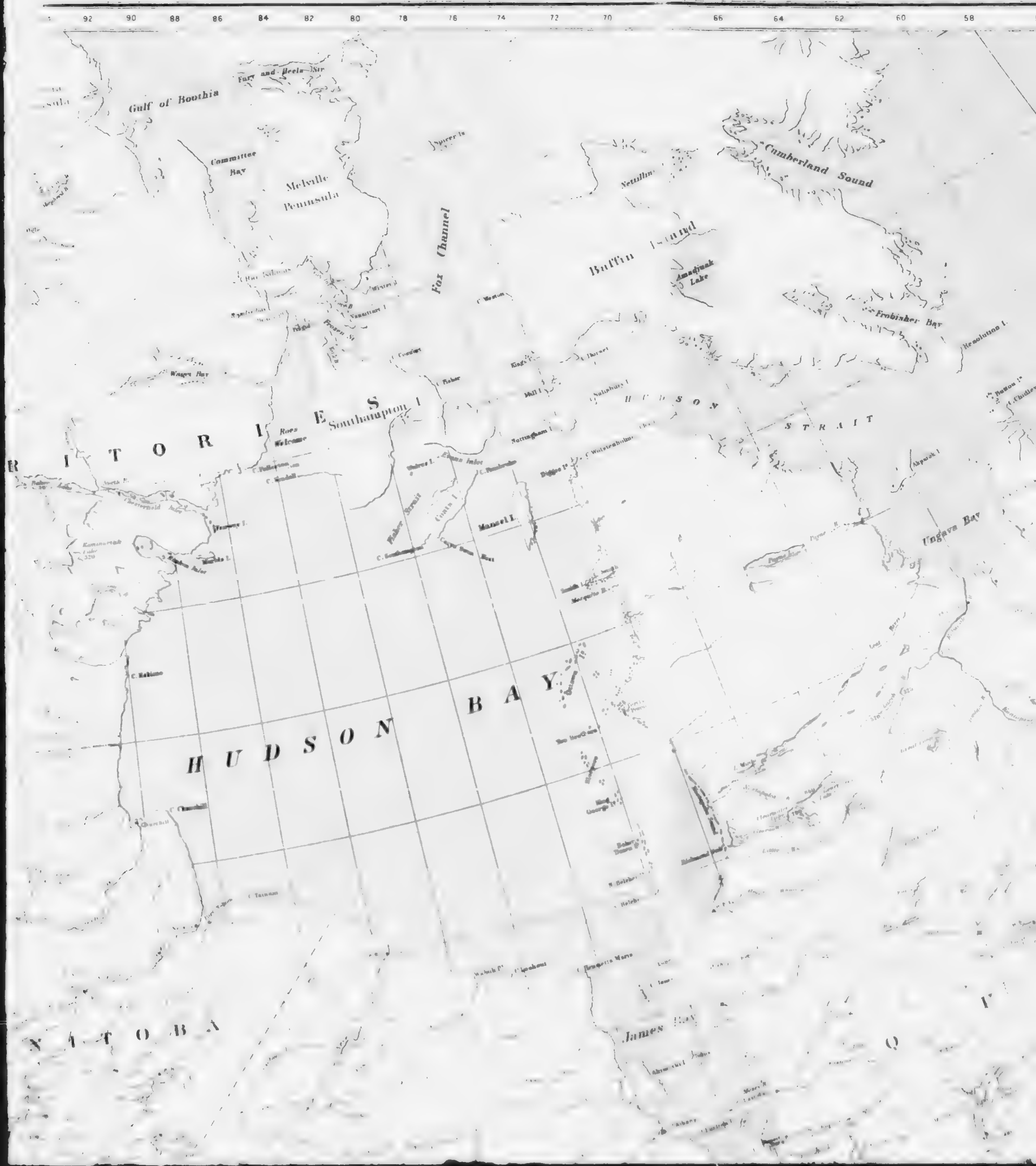
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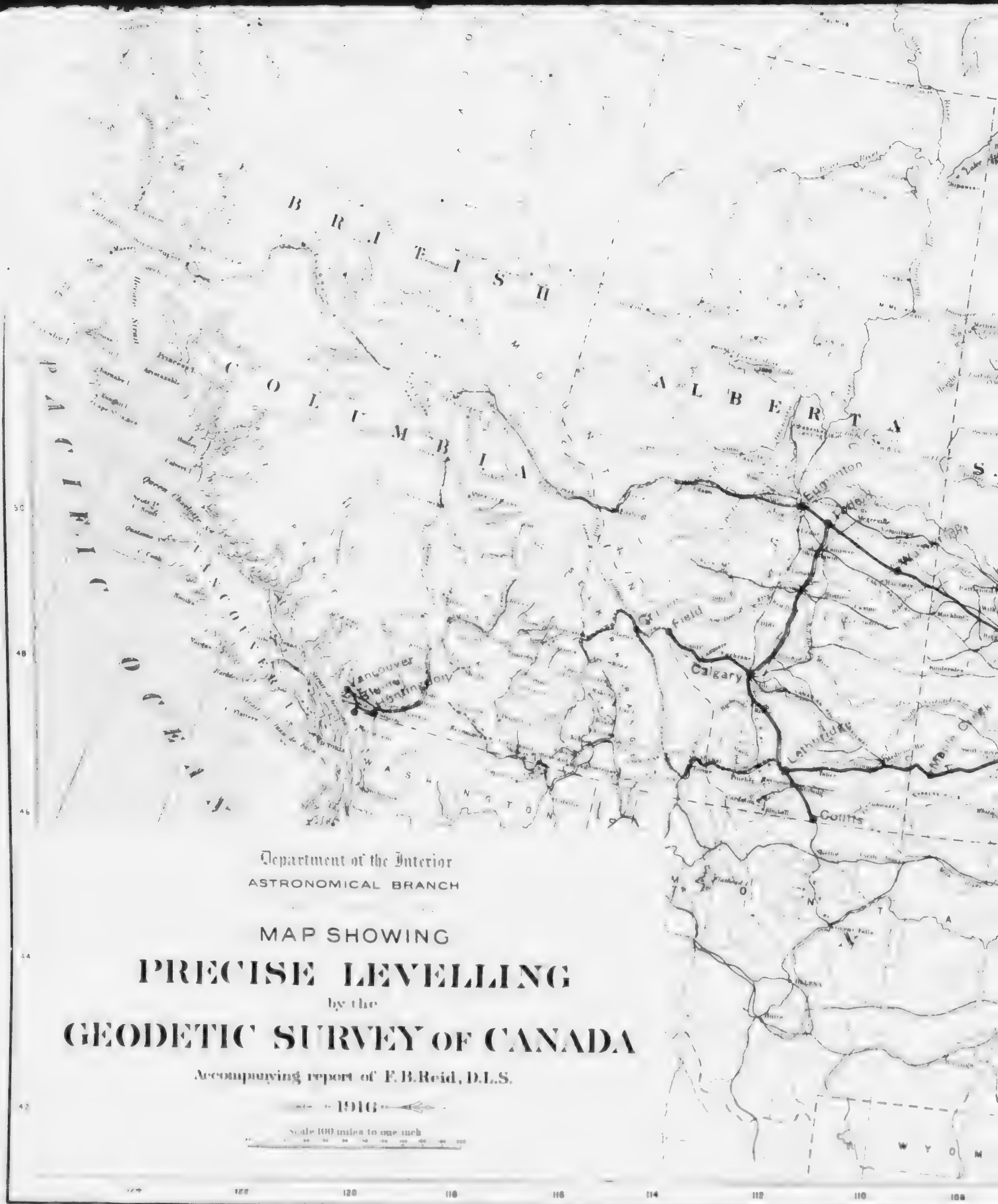












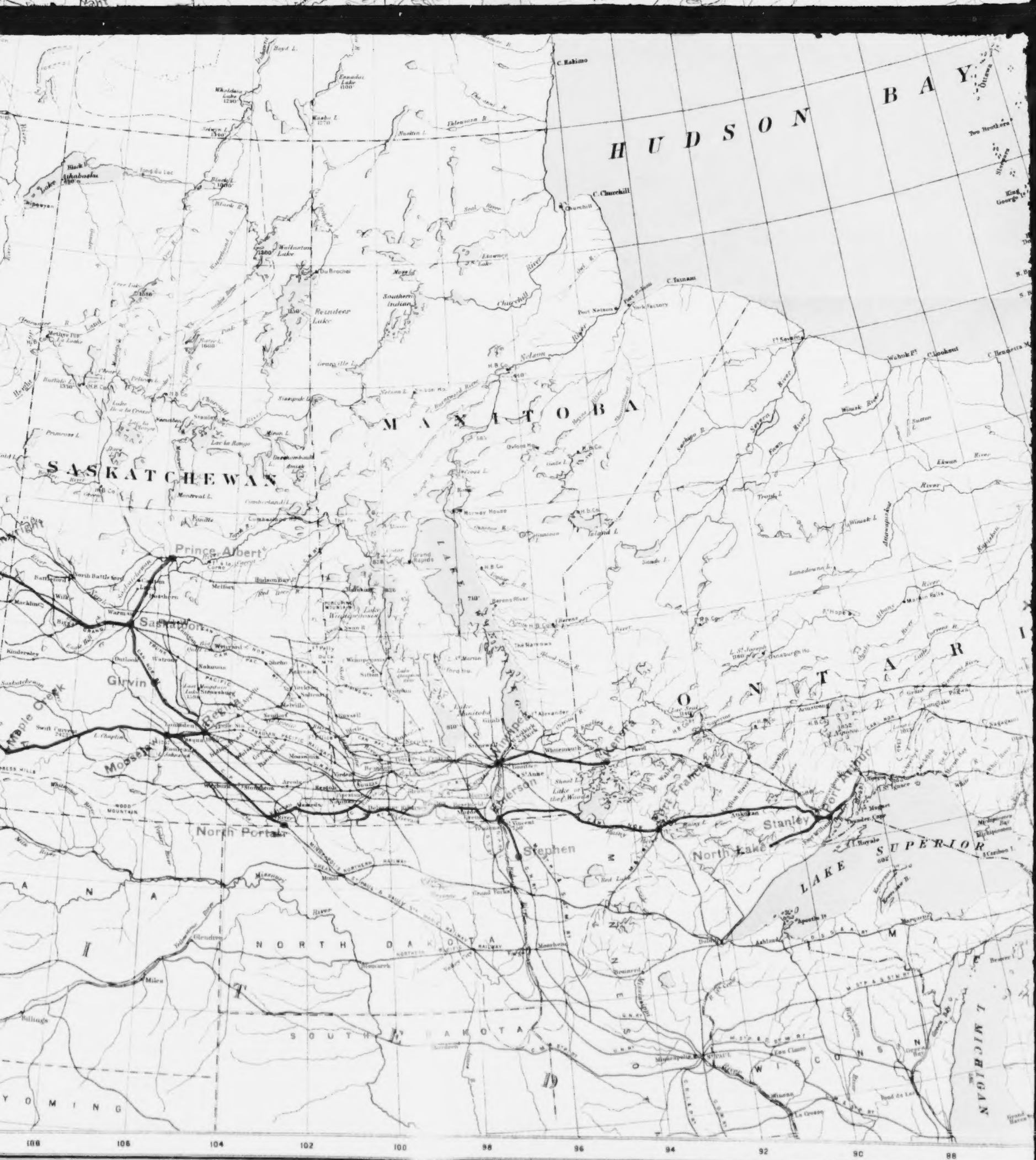
Department of the Interior  
ASTRONOMICAL BRANCH

MAP SHOWING  
**PRECISE LEVELLING**  
by the  
**GEODETIC SURVEY OF CANADA**

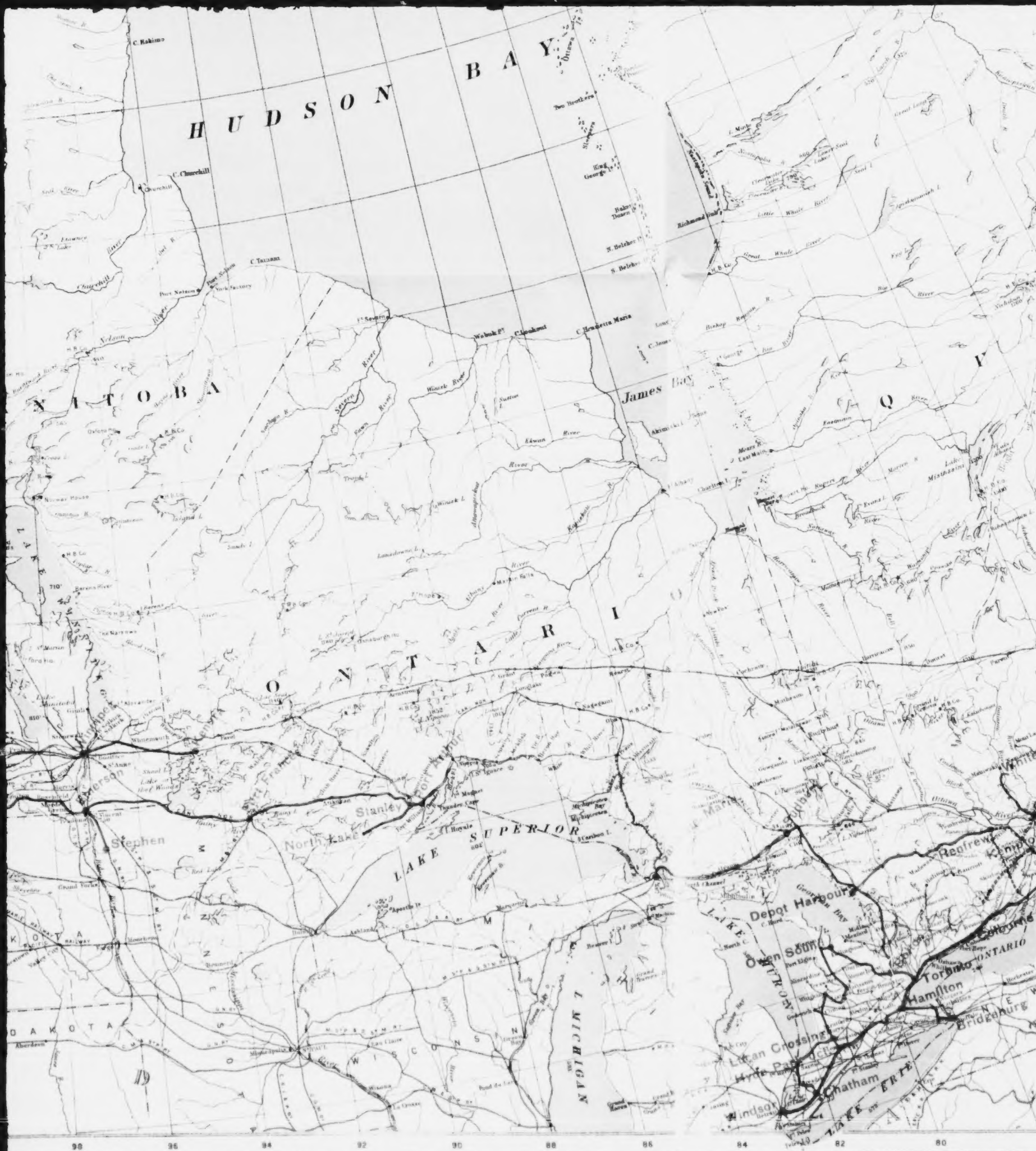
Accompanying report of F.B. Reid, D.L.S.

1916  
Scale 100 miles to one inch





Precise Levelling, Published.  
Precise Levelling, Not Published.



Precise Levelling, Published.  
Precise Levelling, Not Published.





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